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ORIGINAL LECTURES.

HELMINTHIASIS—TAPEWORMS.

A Lecture Delivered at the Medical College of Ohio.

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THE term helminthiasis, which was formerly used to express a peculiar dyscrasia, the so-called verminous crasis of the older writers, is limited in our day to signify simply the presence of mature worms (helminths, ἕιλω, I roll or twist) in the intestinal canal, or immature forms in the organs and tissues of the body. For it is now well established that parasites occur in the body, not by spontaneous generation, or as the expression of disease of the intestines, but only as the result of the ingestion of their eggs or embryos with the food and drink.

Of the whole number of known parasites of man, now in the neighborhood or fifty, twenty-one occupy the interior of the body as the so-called entozoa. Most of these forms are so rarely found as to constitute clinical curiosities, and many of them have never been observed in our country. In fact, but four varieties—the tapeworm, the round worm, the thread worm, and the trichina—are so commonly encountered as to demand especial study by the practitioner of medicine.

With the exception of the trichina, these parasites were known to the physicians of antiquity. Mention is made in the works of Hippocrates of the tapeworm (ταινία, a band), the round worm (στρογγύλος, round), and the thread worm or ascaris (ασκάριζω, I spring), forms which still retain their ancient names. But the most extravagant and erroneous views were entertained of them up to the middle of our own century. Thus Valisnieri believed them to be inherited, Gœtze and Abildgaard claimed that they assisted digestion by consuming the intestinal mucus, and exciting peristalsis, as the Abyssinians still believe, and Jördens went so far with these teleological conceits as to call them the guardian angels of childhood. On the other hand, intestinal worms were supposed to engender all kinds of diseases, and as late as the eighteenth century they were thought to produce scurvy, dysentery, and diabetes. Post-mortem examinations, which disclosed them, interpreted them as a cause instead of a coincidence of disease. Thus, Droste found on autopsy twenty-nine round worms as the cause of basilar meningitis, and Parkinson five tæniæ as the cause of incarceration of the bowels. Valisnieri describes how worms penetrate the vessels to reach the blood; and Waurach, as late as 1844, taught their origin from damp habitations, the excessive use of flour and potatoes, restraint of the emotions, abstinence from coitus, etc. Encysted worms were at this time universally believed to arise by spontaneous generation.

Existing knowledge of intestinal parasites begins with the observations and experiments of Siebold, Steinstrup, Küchenmeister, Davaine, and Leuckart, in 1840–60, which revealed the various metamorphoses and migrations of the egg, the larva, and the fully developed forms, often in different hosts. These changes of form are, however, no more to be considered as alternations of generation, as they are sometimes erroneously described, than are the changes from the ovum to the fœtus, and the mature form of man, which differ in the same or even greater degree.

The first recognition of a difference in the varieties of tapeworm was made by Felix Plater, in 1602, with the discovery of the bothriocephalus (βοθρος, a pit) latus, thus named by Rudolphi in 1810. To these forms was added a third, the tænia mediocanellata, or saginata, by Küchenmeister in 1852. The tænia echinococcus (εχινος, the hedge-hog) was first distinguished as a living thing by Pallas in 1760, and its scolices (σκολιος, crooked) recognized as the tapeworm heads by Pastor Göze in 1782. Except in the case of the bothriocephalus latus, the larva of which has just been discovered by Braun, of Dorpat, the development of the larval into the mature form in all the varieties of tænia in man was demonstrated by the feeding experiments of Beneden, Siebold, Leuckart, and more especially Küchenmeister, who verified his observations on animals in the bodies of criminals which he was permitted to use.

The history of the trichina (θριξ, τριχος, a hair) is purely modern. Calcified remnants of this parasite in muscle were looked upon as dissecting-room curiosities up to 1835, when Pajet took a specimen to Owen, who gave it the name it bears. Leidy, in 1846, discovered in a piece of ham upon his plate the same immature form which was still regarded as an innocent, wandering, nematoid form until 1860, when Zenner discovered it in myriads in the muscles of a patient who had died of a disease diagnosticated as typhoid fever, but marked by extreme pain in the muscles, with œdema of the surface, which symptoms he correctly attributed to the presence of the parasites. Virchow, Leuckart, and Zenker then demonstrated their migration from the intestines to the muscles, and two years later, in 1862, Friedreich made the first diagnosis of the disease in life with the detection of the parasite in a piece of exsected muscle.

The difficulties encountered in the study of these parasites become apparent with the recognition of the difference of the host in the various stages of development. Thus the mature tænia saginata (fat) lives only in the small intestine of man, while its larva or cysticercus dwells in the muscular tissues of the ox. Möbius met it once in a giraffe confined in a zoölogical garden; and Zenker, Cobbold, and Heller bred it repeatedly in the goat and sheep. The mature tænia armata is also found only in the intestine of man; its larva or cysticercus in the flesh of the pig, dog, deer and polar bear (in confinement). The mature tænia echinococcus inhabits exclusively the small intestine of the dog and the wolf, while its larva, the echinococcus, is found in the

liver and various organs of man, the ape, ox, sheep, horse, hog, and many other animals. The mature bothriocephalus latus lives in man, and allied species in many fishes, while its larva infests the bodies of fresh water fish—the pike, trout, eel-pout, etc. The liver fluke, an occasional inhabitant of the liver of man, and much more frequently of the sheep, in which animal it constitutes the disease known as the "rot," lives in its immature form in the body of a fresh-water snail; and the trichina spiralis which occurs in both the mature and immature form in man, and in many other animals —the pig, rat, rabbit, cat, and fox, is received into the body of man by the ingestion of the immature form in pork. As a curiosity illustrative of the difficulty of detection of larval form at times, may be mentioned the case of the tænia elliptica, which in maturity inhabits the intestine of the dog, while its larva is found in the louse of the dog (Leidy).

Tapeworms (cestoides, κεστός, embroidered, a belt; ειδος, like).—Of the three hundred species of tæniæ in the whole animal kingdom, but four are found in the body of man, viz., in the order of frequency in our country, the tænia saginata, armata, echinococcus, and lata, or bothriocephalus latus, derived respectively from the ox, pig, dog, and fish.

The whole animal in its maturity consists of a head (scolex), a slender neck, which, at some distance from the head, shows transverse folds or wrinkles, deepening later or lower down into furrows, which indicate the separate segments (proglottides) of the body. The head of the tapeworm is oval, about the size of a pin's head, and is provided with two to four equidistant suckers about its upper surface. The segments four to twelve hundred and more in number are at first longer than broad, then in some cases quadrate, and finally broader than long. Upper are let into lower segments, and union is firm at first, but lax toward the end of the worm, where detachment easily occurs. New segments are produced from the neck, so that the last segment is always the last so long as it remains united to the rest. Hence the necessity of securing the extrusion of the head in the total extirpation of the worm. Each segment contains or is filled with the generative apparatus of both sexes; hence the animal is hermaphrodite. It is also self-impregnating. The bulk of the segment is taken up by the uterus, which forms an elongated central cavity, with radiating branches stuffed with eggs. The male element is comprised in a bunch of seminal vesicles which empty into a seminal duct, terminating at a pore in the lateral margin of the segment common to the uterine opening or vagina. These genital pores are disposed alternately, or on opposite sides of the different segments.

The tapeworm fastens itself by its suckers to the mucous membrane of the small intestine, the body floating free in loose folds or elongated along the course of the canal, from the contents of which it imbibes nutrition by osmosis. The contents of the large intestine will not support it. It is feebly endowed with motion, so that detached segments voided with feces may migrate by slow vermicular action a few feet from the seat of deposit. More extensive change of place is effected by outside agencies—running of water, processes of manuring, wandering animals, etc. Each segment may contain as many as 53,000 eggs, so that a tapeworm producing 800 ripe segments a year may furnish an annual contribution of 42,000,000 eggs. Fortunately, in the struggle for existence, myriads fail to find the necessary conditions; thus Leuckart calculates the chances of development of an egg to a cysticercus as 1 : 1340, and to a mature worm as 1 : 85,000,000. The tapeworm may live in the intestinal canal from ten to fifteen years.

The egg of the tapeworm is a rounded or ovoid body, provided with a thick envelope containing an embryo endowed with hooklets. Received into the body of an appropriate host, it is freed of its envelope by the action of the gastric juice, protrudes its head, and appears in the form of the larva. The larva is, of course, an undeveloped tapeworm. It has the same head and neck, much reduced in size, but the body remains a vesicle. It is always provided with hooklets, by means of which it bores its way through the walls of the stomach or intestine, to be lodged in adjacent structures or to be carried off by the lymph or blood current to distant organs, where it may excite a destructive inflammation or encysted, remain innocuous. The muscular structure of the body is the soil of predilection, and muscle thus affected is said to be "measly," from measle, a spot. In the course of three or four months the vesicle attains its full development, to the size of a large pea; a new head develops from its inner surface, and the larva becomes a cysticercus (κυστις, bladder; κερκος, a tail). The cysticercus lives, as a rule, from three to six years, when it perishes to undergo calcareous degeneration; but ingested during its life into the stomach of man, it attaches itself to the small intestine, reproduces segments which become sexually mature in the course of three or four months. Periods of quiescence usually occur in this regard. Bettelheim records a case in which no segments were given off in the space of three years. Ordinarily but one tapeworm is found in the body of man, yet abundant instances are recorded of the presence of two or more of the same or different varieties at the same time, or of their coincidence with other forms of intestinal worms. Beranger Feraud once found twelve in the body of one individual, and Kleefer, of Görlitz (*Deutsche Klinik*, 1853), records a case in which forty-one tæniæ were discharged with heads.

The different varieties of tapeworm may be readily distinguished. The tænia armata, or pork tapeworm, erroneously called solium, because less frequently found alone than any other form, is known by its coronet of 22–32 hooklets, whence its name, on the circular rostellum, of its head, which is likewise provided with four small circular suckers. Its segments number 750–825, becoming sexually mature at the 450th member, as recognized by the presence of the genital pore, so that the worm may reach a length of 7–10 feet. They are at first longer than broad, then quadrate, and finally extremely oblong, whence the synonym cucurbitina. They are rarely discharged, except at stool. The uterus consists of a median cavity, never quite reaching the upper or lower margins, with 7–12 lateral branches, radiating irregularly like the branches of a tree, hence dendritic. Its larva, the cysticercus cellulosa, provided with four suckers and six horns, is found in the tissues of the pig, dog, deer, rat, sheep, ape, and bear, as well as in man, in the liver, subcutaneous connective tissue, muscle, eye, and brain. Its circular ova contain also

six hooklets. The tænia armata is found wherever raw or half-cooked pork is used as food.

The tænia saginata, or beef tapeworm, erroneously called medio-canellata by its discoverer, the narrow cylindrical uterus having been mistaken for a median canal, sometimes still called lata, because of its breadth, is known by its greater thickness and breadth, whence its name. Its head is larger and more square, and being devoid of a rostellum and hornlets, more flat on the top. It has likewise four suckers (though there is of this species, as well as of the armata, a variety which has six). The whole worm, more especially the head, is rather darker from the presence of more pigment matter than the tænia armata. The neck is shorter and broader. It is larger than the tænia armata, its twelve hundred and more segments measuring from ten to fourteen feet. Each segment is broad and long, often one-half by one inch. The body of the uterus quite reaches the upper and lower margins of the segment. But it is more narrow than in the armata, and all its branches are finer. These lateral branches, more numerous than in the tænia armata, fifteen to twenty-seven on the side of the genital pore, thirty-one on the opposite side, are always given off dichotomously. The segments are voided, not only at stool, but often also spontaneously. Patients who are continually or occasionally discovering detached fragments in their clothes are nearly always hosts of the tænia saginata. Its larva is found in cattle and various other ruminants, but not in man. Its eggs, of which each segment may contain 35,000, are oval, larger than those of the tænia armata, and void of hooklets. The tænia saginata is found wherever raw or rare beef is used as food; consequently much more frequently in our country than the tænia armata. Leidy states that the tapeworms from Philadelphia and its vicinity which he had occasion to examine in the last twenty years, "perhaps in all about fifty," were specimens of tænia saginata. The condition assumes epidemic proportions in Abyssinia, where the flesh of cattle is eaten while still quivering with life. A mature worm was reared from a beef "measle," purposely swallowed by a student, in fifty-four days.

The tænia lata, or bothriocephalus latus, differs in marked degree from the preceding varieties. It is the longest of all the tapeworms, its 4000 segments attaining a length at times of twenty-five feet. The head is long and narrow, and is slit at the sides to form the bilateral elliptical suckers which give the worm its name. The segments not sharply separated are twice to four times as broad as long. The central uterus has the appearance of coils of intestine. The genital pore is central on the ventral face. The cysticercus is provided with spiculæ and a ciliated envelope, by means of which it swims in water. The eggs are oval and are furnished with a lid (operculum) at one end to afford escape of the embryo. This species of tapeworm is found wherever raw or partially cooked fish is used as food, consequently in Russia and Sweden, East Prussia, Poland, and parts of Switzerland, not in our country. The sole specimen thus far reported in our country was found by Leidy, derived from the body of a recently immigrated Swede. The mature tænia lata is found in the intestine of the dog as well as in man.

The tænia echinococcus, or hydatid tapeworm, is the smallest of all the tapeworms, measuring but one-quarter of an inch in length. It lives in the mature state in the dog and wolf, not in man; the whole duration of its life being not more than seven weeks. The head resembles that of a diminutive T. armata in that it is furnished with four suckers, a rostellum and a double row of hooklets. The segments, in number but four, progressively increase in size to the last, which is as large as all the rest, and which is alone mature.

The larva (echinococcus) of this tænia which infests man and many of the herbivora, horse, ox, sheep, etc., differs from that of all other tapeworms, in that it is endowed with the property of self-multiplication to a degree limited only by the restraint of outside pressure. The eggs issuing from the anus of the dog and brought often in contact with the nose and mouth of this animal, may be thence received into the mouth and stomach of man where the six-hooked embryo is liberated to penetrate the walls of the intestines and emigrate to various parts of the body. From the fact that the liver is found infested more frequently than all the other organs together, the inference is natural that the embryo is carried thither by the portal vein. Measly liver fed to dogs reproduces the mature T. echinococcus in the intestine of the dog. Having reached its destination in whatever organ, including the bones, the echinococcus develops the hydatid tumor, which may consist of a single cyst, or by proliferation from its inner wall of multiple daughter cysts, or from them in turn of granddaughter cysts, to the number of many hundreds. The fluid of hydatid cysts is clear and limpid. It is distinguished by the presence of common salt and the absence of albumen. The echinococcus tumor is rare in our country. Osler saw it three times in 800 autopsies in Montreal, and after ransacking museum catalogues, journals, society proceedings, etc., he could find but sixty-one cases in the whole of North America up to the year 1882. But it is safe to say that the majority of cases in our country do not find their way into print. For instance, the pathologist of the Cincinnati Hospital, a thoroughly competent observer, informed me, on the occasion of reporting the only case which occurred in my own practice, that he had himself seen three cases since the beginning of his service, none of which was reported. It is common in countries where the dog is a most intimate companion of man. In Iceland, where the dog shares with man both board and bed, the disease is epidemic, one-fifth of all sheep and one-seventh of mankind being thus affected, females, from their indoor life, oftener than males. Four to five per cent. of sheep are also thus diseased in Victoria, Australia, where the affection is likewise very common in man.

Mature tapeworms are seldom dangerous to man. In many cases they produce no symptoms of any kind, and their presence is recognized for the first time upon the post-mortem table. Or the discharge of segments with the stools, the appearance of them in the clothes at other times, is the first indication of their presence. Individuals who use water-closets may thus entertain these guests unawares until on some occasion the feces are voided visibly, as upon the ground in the open air or in a night vessel. As no mature worm penetrates the intestinal wall or evolves noxious products, what symptoms do occur are due to mechanical irritation of the intestinal walls or are reflex manifestations. Thus,

anorexia, nausea and vomiting, colic, diarrhœa or alternate constipation, heartburn, pyrosis, flatulence, the group of symptoms characteristic of gastric catarrh, summed up under the vague term dyspepsia, and, as effects, lassitude with malaise and depression of spirits are not infrequently present. A ravenous or insatiable appetite is exceptional, and when present is due not to the consumption by the parasite of nourishment, which is insignificant in amount, but to reflex irritation or defective assimilation, the result of irritation. More importance may be attached to morning vomiting which, in the absence of more common causes, pregnancy, gastric catarrh, cirrhosis, tuberculosis, Bright's disease, etc., may be an index to the condition. Young children or highly sensitive adults may exhibit more pronounced disturbance of the nervous system. Thus, dilatation of the pupils, itching of the nose and anus, palpitation of the heart, choreic manifestations, even veritable convulsions, epilepsy, have been observed in these cases. But the symptoms caused by intestinal parasites are exaggerated as a rule. All the symptoms mentioned may be produced by any cause that will excite the same irritation, and grave accidents are to be attributed to tapeworms only in cases where the symptoms subside with the expulsion of the worms. Rare cases of this kind are recorded. Thus, Williams describes the case of a young girl who was cured of a periodically recurring blindness and deafness of several hours' duration by the extirpation of a tapeworm, and Homolle reports a case of epilepsy cured in the same way. In some cases grave symptoms admit of a different explanation. In this regard, especial danger attaches to the pork tapeworm, in that the deglutition of its eggs or their premature discharge in the intestinal canal may lead to the development of cysticerci in the same host. This accident may take place in sleep when the hand is used to relieve itching or irritation at the anus or moist segments escaping from the anus and crawling about on the skin are grasped in relief of unpleasant sensations. Küchenmeister often found fingers contaminated in this way. Cases of self-infection have also happened from careless handling of worms after their expulsion. Moreover, the act of vomiting may introduce segments into the stomach, where eggs may be liberated to develop into cysticerci. Seeger mentions six cases of ejection of tapeworms by the act of vomiting, and Rebsamen reported the case of a woman who withdrew a tænia lata from her mouth with her fingers. Frankenhäuser relates a case of cysticercus in a patient who had previously vomited a tapeworm, and Lewin (Charité Annalen V.) collected a number of such cases. In two of Gräfe's cases of cysticercus of the eye, the patients, while hosts of the worm, had suffered from the vomiting of pregnancy; and in the cases of cysticercus of the brain reported by Möller, the patient had had a tapeworm expelled twenty years before death. Thus, the existence of severe nervous symptoms would awaken the suspicion of the presence of cysticerci. But examples of this kind are quite exceptional. In the vast majority of cases grave nervous symptoms are due to other and more obvious causes.

The diagnosis of the condition of the patient is sometimes quite obscure. The only positive proof of the existence of tapeworms in the body is the presence of segments in the stools or clothes. As in most cases eggs are not discharged in the intestines, it is very rare to find them in the stools. Where reasonable doubt exists, the administration of a cathartic or of an innocent anthelmintic, to be followed by a cathartic, may secure the proofs. Differentiation of the form of tapeworm is easily made. The segments are flattened by pressure upon the object-glass and examined with a power of 500 diameters, when the characteristic features of each form become apparent at a glance. Dried specimens should be first softened in water. The occasional evacuation of segments, independent of stools, or the discovery of them in the clothes, speaks in favor of the tænia saginata. The echinococcus tumor may sometimes be recognized by its situation. It has, as stated, a marked predilection for the liver. Or the fluid contents of a cyst may be withdrawn by an aspirator and tested for the presence of salt and the absence of albumen. Scolices and hooklets may be exceptionally discovered in the fluid on microscopic examination.

Palpable tumors communicate to the hand a peculiar unmistakable tremulous thrill. Deep-seated fluctuation of a hydatid tumor may be distinguished from that of an aneurism, abscess, or common cyst by the examination of aspirated contents. In all cases of tapeworm, and especially after treatment, the feces are to be subjected to close examinations by repeated washings that the minute and easily overlooked head of the worm may be discovered.

Prophylaxis. The subjection of meat to a boiling temperature throughout, which effectually destroys all cysticerci, is the chief preventive of tapeworm. The recognition of this fact with regard to the trichnia spiralis has already diminished the number of cases of tænia armata. Cleanliness is the factor of next importance. The oriental custom of ablutions before each meal may be commended in this regard. Individuals affected with the disease should be enlightened as to the fact that they are possible sources of infection of others. Bettelheim speaks of having seen in a house of poverty and squalor segments of tapeworm deposited upon and crawling about the floor, furniture, and beds. Butchers, cooks, all persons employed in the preparation and distribution of meats, should be cautioned as to the necessity of cleanliness of hands, instruments, vessels, and clothing. To prevent infection of animals with eggs, habits of decency in regard to the deposit of feces should be enforced, and check should be put upon the barbarous custom of promiscuous defecation. A Texas physician informed Prof. Leidy, to whom he had sent a piece of measly pork for examination, that all the pigs in the place were thus affected and that there was not a privy in the whole village. In the administration of anthelmintics to the subjects of the pork tapeworm, selection should be made of such remedies as will not cause vomiting. Especial attention is to be paid in this regard to the relief of the vomiting of pregnancy. Physicians as well as patients need repeated injunction against the careless handling of tapeworms in their examinations. Specialists who have devoted a large part of their lives to the study of intestinal parasites become exceedingly careful in their manipulations. Küchenmeister states that he always handles tapeworms with two pairs of long forceps seizing them as near the points as will secure firm purchase; and Cobbold warns against the danger of leaving specimens about or care-

lessly throwing them away, with the emphatic injunction to destroy them by fire.

The Greek and Roman physicians possessed sixty remedies for the cure of tapeworm, and the number has been greatly increased in our day. But few of these agents, however, have stood the test of time. Such uncertainty has attended the use of most of them as to have left the treatment of the condition a fertile field for quacks. This uncertainty depends, however, upon the lack of observance of a few simple precautions, the chief of which consists in the evacuation of other contents of the bowels as effectually as may be, that the remedies used may come in direct contact with the worm. Elaborate preparatory and supplementary treatment is now in the main superfluous, but a light diet during the day, or better, a fast broken only by a cup of coffee or a glass of milk should precede the administration of the remedy selected. These remedies may be ranked in efficacy as follows:

1. The bark of the pomegranate root of which three ounces should be macerated in twelve ounces of water for twelve to twenty-four hours, to be then reduced one-half under gentle heat. The whole quantity is to be taken in divided doses in the course of an hour. Pomegranate root remains the most effective of all anthelmintics, and would long since have excluded all others did it not at times produce nausea, vomiting, and colicky pains. To avoid the first of these evils, Bettelheim suggests the introduction of the infusion into the stomach by means of the stomach pump, and to obviate all of them, Feraud recommends pelletierin, an active alkaloid of the root named in honor of the discoverer of quinine. One to two drachms of the infusion of senna is to be taken on the morning following a day of fasting, and in the course of an hour one-fourth to one-half of a grain of the tannate of pelletierin suspended in water. Half an hour later the same dose is repeated, to be followed in an additional half hour with a tablespoonful of castor oil, the patient remaining meanwhile quiet in bed, to avoid disturbance of the stomach. In one instance twelve beef tapeworms were expelled at once in this way.

2. Turpentine is a powerful tæniacide, but the use of it is liable to cause headache, pain in the stomach, fever, and strangury. These effects are, however, much less frequent after large than small doses. Hence the dose for an adult should be never less than one to two ounces, for a child, one drachm to one ounce according to age. It may be administered in emulsion with white of egg or be briskly stirred in half a glass of milk and swallowed rapidly. Should it fail to act as a cathartic, it should be followed with a dose of castor oil.

3. Male fern, the ethereal extract, two drachms in four or five gelatine capsules of which one may be swallowed every five minutes with the aid of a cup of coffee. A dose of castor oil with brandy should follow the capsules in the course of half an hour.

4. Kousso, koussin, pumpkin seeds, santonin, kamala, carbolic acid, zinc, and other parasiticides of less value.

Every attempt at treatment being a forcible intervention, only such individuals should be subjected to it as are known to be affected. The mere statement of a patient is not sufficient proof, and cases of tæniaphobia do not justify it, on so-called psychological grounds, because failures only aggravate the condition as a rule. Pregnancy, advanced age, debility from any cause are contraindications to all treatment. The physician must be awake to cases of deception. Heller reports the case of a child finally debilitated by repeated treatment because of the continued exhibition of segments of the worm, when, upon closer examination, it was discovered that the fragments did not come from the child at all, but from a lazy nurse who made a convenience of the child's stool chair.

Echinococcus cysts are not amenable to relief by internal medication. If further evidence than the failure of every kind of drug were necessary to prove this fact it may be found in the statement of Leidy, who discovered in the body of an English sailor, sent to him for dissection, the tissues having been thoroughly bleached by an injection of zinc chloride several days after death, a hydatid tumor of the size of the fist in the right iliac region full of daughter cysts, containing still living scolices. The most approved method of treatment of hytatid tumors is by aspiration of their contents. Murchison reported, of forty-six cases thus treated, thirty-five successful results. In ten cases subsequent suppuration necessitated incision, whereby eight cases recovered, and two died. The remaining case died of acute peritonitis in twenty-four hours. Fogg, Hilton, Durham, and Handfield report nine cases cured by electrolysis. Jonasen, of Iceland, still adheres to opening by the caustic method of Récamier. The rare form of degeneration known as the multilocular cyst is always fatal.

ORIGINAL ARTICLES.

SUBCUTANEOUS DIVISION OF URETHRAL STRICTURE.[1]

BY C. H. MASTIN, M.D.,
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(Concluded from page 287.)

THE healing and suppuration of an open wound being long and tedious, and consequently exposing a patient to the risks of pyæmia, whilst structures having no connection with the existence of the stricture are unnecessarily divided, naturally induced the profession to seek other and less formidable measures of relief. These facts led Mr. Henry Dick, of London, in the year 1853, to publish, in the *Medical Times and Gazette*, a critique upon the operation of Mr. Syme, and at the same time to lay before the profession a description of a new operation, which he termed "The Subcutaneous Division of Stricture." Subsequently he presented, in 1855, a memoir to the Academy of Medicine of France upon the same subject, and therein gave the histories of several successful operations which he had performed. After this the operation was then adopted by Mr. William Allingham, and also by Mr. William Adams, both of whom made favorable reports of successful operations.

I will now briefly describe the method of Mr. Dick, and then close this paper with an illustration of an operation which I devised in 1868, and which,

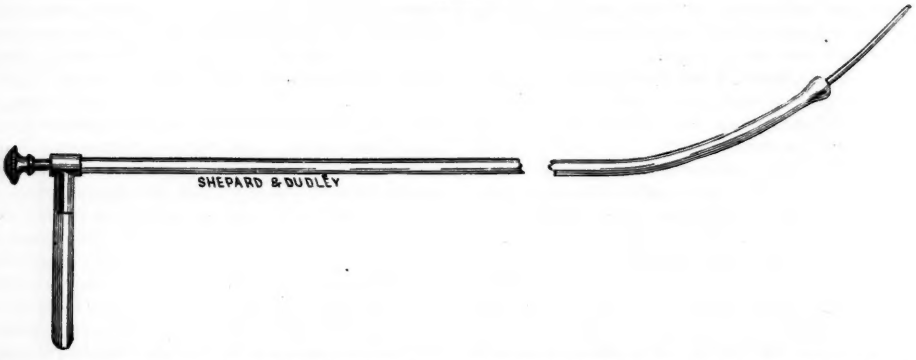
[1] Read before the American Surgical Association, May, 1886.

to the present time, I have seen no valid cause to discard.

His method consists in first dilating the stricture sufficiently to admit the director of his catheter, which is a medium-sized catheter of moderate curve, upon the end of which are two buttons or knobs having a groove between them, which groove is continued on, into, and along the director; the catheter contains the small grooved director which can be drawn in or pushed out, so as to traverse the stricture (Fig. 8).

which will necessarily prevent its coming into general use. In the first place, it is difficult to perform, and requires a degree of dexterity which does not belong to the profession at large; then we have no absolute proof that the director has traversed the stricture, for it may have penetrated a false route, and the incision made subcutaneously, in that event, might be productive of serious consequences. Then, again, he holds as a necessity that *the stricture must, to a small extent, first be dilated;* this is required be-

FIG. 8.



The operation is done in the following manner: The catheter, with the director concealed within it, is passed down the urethra until its point reaches the anterior face of the stricture, when, by a gentle manipulation, the point of the director is made to engage the stricture, and is then passed on until it enters the bladder; the surgeon then takes a very small sharp-pointed tenotome (Fig. 9), and, feeling in the

fore his conductor can be introduced. Now, if it is possible to dilate the stricture sufficiently large to admit his director, I hold, upon the same grounds of objection to the operation of Mr. Syme, that there is no necessity for an external operation, for the reason that, if a director can be passed, it is possible to dilate, or, this failing, then to do the safer operation of internal urethrotomy.

FIG. 9.

perineum with the index finger of his left hand for the buttons or knobs, plunges the knife between them into the groove and along the director through the stricture, being at the same time careful to see, or rather to feel, that the stricture is freely cut throughout its entire length, the edge of the tenotome being directed downward. After the stricture has been freely incised, the director is withdrawn into the catheter, which is now removed from the urethra, and a full-sized catheter passed into the bladder to ascertain whether the urethra has been fully cleared, and also to empty the bladder of any urine which may be present. The little wound is covered by a bit of adhesive plaster, a compress with a T-bandage completes the dressing. No retained catheter is left in the urethra, but whenever there are calls to urinate, the water is drawn off with either a silver or soft catheter. This is certainly a very unique and ingenious operation, and one which strikes at the chief point of objection to all external operations done in the old way, viz., an open wound in the perineum which, in most cases, must heal by the slow process of granulation. Still there are objections to Mr. Dick's operation

Mr. W. F. Teevan, of London, has proposed and executed a modification of the operation of Mr. Dick, having the same end in view, viz., to do away with a large external incision, and substitute in its place a small opening through which he practised a subcutaneous urethrotomy. The method employed was simply one in which a small whalebone guide was worked through the stricture, and over this a small conducting catheter was in its turn introduced into the bladder; then along its groove the tenotome of Mr. Dick carried through the contraction, and the after-treatment conducted as in the operation of Mr. Dick. I am not informed of the success which has attended this procedure of Mr. Teevan; but if permitted to judge of the operation from the instruments which he used (Fig. 10), I am not very favorably impressed with it.

I now desire to describe briefly an operation which I have employed since the year 1868, whenever an occasion has demanded an external section. Thus far it has proved entirely satisfactory to me, and especially so to those upon whom I have had an occasion to perform it.

In the year 1872 I wrote a paper upon the result of my operations by this method, and since that date to the present, with an increased experience, I have seen no reasons to alter the views which were then expressed. I now claim nothing of originality

FIG. 10.

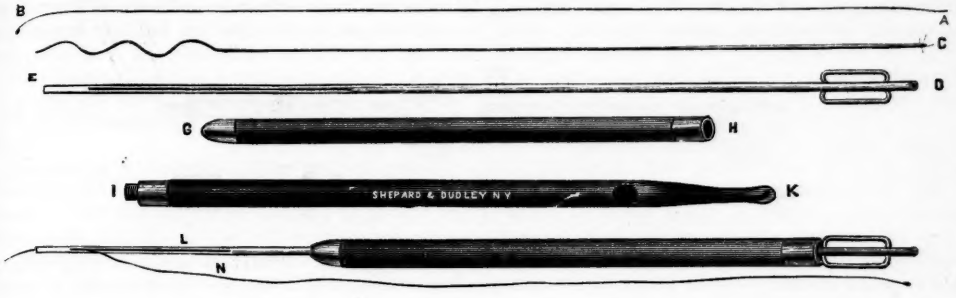


FIG. 11.

for the operation, since it is based almost entirely upon the old *le boutonnière;* the incision being very small, and made anterior to the stricture; then, a very small probe-pointed director, or whalebone guide is passed along through the stricture, and a delicate tenotome incises its upper wall subcutaneously; the small wound in the integuments is closed by pin sutures, and left to heal by primary union. Adhering to the maxim, "dilate where you can, cut where you cannot," I only resort to this operation in those cases where no catheter or guide can be made to traverse the urethra from the meatus to the bladder; cases which require some operation for the immediate evacuation of retained urine, and in which it is not possible for me to perform an internal urethrotomy.

The patient, duly prepared by opening the bowels freely with an enema, and a hot hip bath to tranquillize the nervous system, is placed upon a table, then secured in the ordinary position for cystotomy, and anæsthetized. I now pass down the urethra the tube of Benique (Fig. 11), which is a plain silver tube open at both ends, about nine millimetres in diameter, and from six to eight inches in length; this tube protects the walls of the urethra, and puts on the stretch the face of the stricture. The tube is now filled with a bundle of small filiform whalebone probes which are carefully passed down to the stricture; by trying first one and then another it is possible that one may engage the opening and pass on into the stricture. This being accomplished, I remove the disengaged probes together with the tube, and after securing the probe in the bladder, I pass over it a Wheelhouse staff which has been drilled through its end to answer the purpose of a Gouley staff, and carry it down to the stricture; it is now handed to the assistant, who holds it lightly, yet firmly, against the coarctation, whilst I open the urethra in the groove of the staff, making an incision about half an inch in length. I then draw outward the staff just sufficiently to enable me to find the whalebone probe as it passes through its end and on into the stricture; this I secure by passing a small blunt hook behind it, after which the staff is removed entirely from the urethra, and the distal end of the probe drawn out through the little wound which has been made; and now, over the probe I pass a little gorgeret (Fig. 12); this has its blade directed upward, and being run along the probe, as its guide, it passes through the opening into the

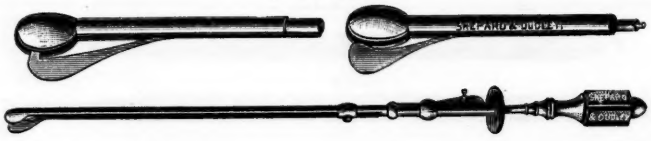
FIG 12.

FIG. 13.

urethra, and then down the stricture, which is cut on its superior face. A catheter is now passed along the entire urethra into the bladder and the urine evacuated, after which I carefully examine the site of the stricture with graduated metallic ball probes (Fig. 13) for the purpose of detecting any bands which, perchance, may remain; if found, they are divided by the retrograde urethrotome of Civiale (Fig. 14), and the full calibre of the urethra restored.

thread in the form of the figure 8; then the sound is removed, and its place occupied by a full-sized catheter passed down to the prostatic urethra, but not into the bladder. The patient is put in bed and kept on his side, with instructions to push the catheter into the bladder when he has a call to urinate, and always, so soon as the urine has been discharged, to withdraw the catheter sufficiently far to get it out of the bladder, but not beyond the

FIG. 14.



In the event, however, that it is not found possible to pass a whalebone probe in the first instance, so as to gain command of the stricture before opening the urethra, I then pass either the staff of Wheelhouse, Gouley, or an ordinary staff of slight curve with deep groove, down to the face of the stricture and practise the Leeds operation, with the exception that I do not rip open the whole stricture, but having gotten the whalebone probe through the coarctation, I thread over it the little gorgeret and incise it on its superior face, just as described in the instance where the probe was passed along the tube of Benique, always taking care to sever any and all bands which may remain. This opening simply serves the purpose of shortening the canal and bringing us nearer the obstruction; it furnishes us a passage of only some few lines in length in which to manipulate our instruments, in place of a canal of several inches in extent, as would be the case if the urethra had not been opened. I thus, virtually, perform an internal section; I do not rip open the whole coarctated canal and lay bare to the external wound the cavity of the urethra, but I leave it, so far as the stricture is in question, just in the same condition as an urethra upon which I had done an internal urethrotomy.

In the absence of the little gorgeret, I have found a very narrow-bladed urethrotome of Maissonneuve, conducted by a small filiform bougie passed through the external opening and coiled within the bladder, to serve a most excellent purpose, provided the staff is grooved on its concavity, so as to insure the incision being made upon the roof of the urethra. Such, in brief, is the method I have adopted of operating *externally*, and find that it is easy of execution, and satisfactory in its results.

Having carefully divided any existing bands, and restored the lumen of the urethra, I then pass a sound into the urethra, and, after the slight oozing of blood has ceased, I wash the parts thoroughly with cold water, to which may be added either a chlorine or weak mercury solution for the purpose of cleansing and disinfecting the wound; now I close the wound accurately with two or three pin sutures, passed deep enough to engage the divided edges of the urethral canal, and, after coaptating the edges of the skin, I encircle the pins with a flat stricture. This catheter is used for only twenty-four to thirty-six hours, just long enough to insure the protection of the wound from the passage of the urine until it has been in a measure glazed over, and the strictured portion softened up by the presence of the inlying catheter. On general principles I am opposed to the *sonde à demeure* or retained catheter, and for obvious reasons too patent to need mentioning here; but the sound or catheter, used as I suggest, answers all the purposes for which it is intended, and keeps the urine from the wound until it is sufficiently protected by a glaze which prevents the urine passing into the external incision. At the expiration of this time the catheter is dispensed with and the patient left to pass his urine at will. About the fourth or, at latest, the sixth day, I remove the pins, and do nothing more to the wound save keep up the dressing of lead-water and opium—which is applied immediately after the operation—for two or three days longer. Now the patient is permitted to get up and stir about, and within eight to ten days he resumes his former vocations. The after-attention is such as is usual in all operations for stricture, whether they be external or internal, viz., the systematic use of gradually increasing steel sounds until the maximum calibre attainable in the special urethra has been reached.

With this course judiciously pursued, I find that I am able to discharge my patients perfectly healed within from eight to twelve days; and in not a single instance, out of some twenty-five to thirty operations, have I had any hemorrhage or the annoying complication of urinary fistulæ to contend with.

The advantages to be derived from this operation are, the short time of confinement for the patient, freedom from hemorrhage, quick union by primary adhesion, and the small amount of resultant cicatricial tissue, which is always deposited in greater proportion the longer the healing process continues. The retained catheter for the first day or two does good rather than harm, since it protects the fresh incision from the toxic effects of the urine until it has become glazed over with lymph, and acts, at the onset, by pressure upon the divided stricture, compressing the vessels which have been divided and which might bleed after reaction; it also sustains the

urethra as a splint, and prevents the stricture from reuniting until we have time to begin gradual and systematic dilatation with the steel sound. The comparative immunity from urethral fever which my patients have enjoyed after this operation, I feel certain, is due almost entirely to the use of the inlying catheter as I employ it. I do not desire to be understood that I advocate the use of a retained catheter throughout the entire confinement of the patient to bed, but that I use it only for the first twenty-four to thirty-six hours—just sufficiently long to permit the wound to glaze over with lymph, and model, as it were, the granulations by gentle pressure.

In examining the details of the last ten operations which I have done by this method—all of them bad cases—I find that they were enabled to get out and be around the city in the following order: 3 on the fourth day after the operation, 1 on the fifth day, 2 on the sixth, 2 on the seventh, 1 on the ninth, and 1 on the twelfth. The others recovered in about the same proportions.

I am not apprised if any other method of performing external urethrotomy has afforded like rapid results.

ADDITIONAL CASES OF THE SÄNGER CÆSAREAN OPERATION.

Reported by ROBERT P. HARRIS, A.M., M.D.,
OF PHILADELPHIA.

IN THE MEDICAL NEWS of July 17th, I presented a tabular record of 28 Sänger operations, of which 23 were performed in Continental Europe, and 21 of these in Germany. Mainly through the kindness of Dr. Sänger and other correspondents, I have received, in two months, an addition of 10 cases, making 38 in all, of which 33 are European, and 14 belong to the current year. Of these 14, 12 were saved, and probably all of the children, but certainly 13, the fate of 1 not having been mentioned.

The 33 European operations saved 26 women and 31 children, a record much more promising than that by the Porro method. It must be very gratifying to my friend Dr. Sänger to feel that he has been the originator of this life-saving improvement, and to find such noted gynecologists as Profs. Breisky, of Prague, Chiara, of Florence, and Ottavio Morisani, of Naples, making trial of it.

In my former record the cases of Drs. Prochownick, of Hamburg, June 27, 1884, Veit, of Bonn, June 25, 1885, and December 21, 1885, Schauta, of Innsbruck (his second), Dec. 28, 1885, and Prof. Breisky, of Prague, were omitted from their respective places. Dr. Prochownick's patient was a primipara of thirty-eight, having a deformed pelvis, with a conjugata vera of 3⅛ inches, and was in labor forty-four hours; he saved both mother and child. Dr. Schauta's patient was a primipara of twenty-five, and in labor twenty-eight hours; she and her child were likewise saved. Prof. Breisky operated, Feb. 4, 1886, upon a 3-para of twenty-eight, who had been in labor three days. The cause of obstruction was a cystic tumor strongly attached to its surroundings, and in the Douglas cul-de-sac. Septic infection was produced by the cyst contents, and the woman died the next day; the child was saved.

Dr. Leopold operated for the tenth time, in June, 1886, the patient having pelvic contraction, and saved both mother and child. This gives him a loss of one woman in ten, or, for his hospital, a saving of 10 women and 11 children from 11 operations.

Prof. Domenico Chiara, of Florence, operated on June 29, 1886, upon a primipara of twenty-one, having a rachitic pelvis, conjugata vera 2¾ inches. The woman was sufficiently recovered to leave her bed for a few minutes on the tenth day; the fœtus was saved.

Prof. Morisani operated upon July 2, 1886, and thought his the first Sänger case in Italy, but was three days too late. He unfortunately lost his patient in thirty hours, from what cause his letter does not state, neither does he mention the fate of the child. An autopsy showed that both the serous and muscular edges of the uterine wound had united. He expressed himself as very much pleased with the prospective value of the improvement, in its application to Cæsarean cases, as a means of lessening their danger.

Dr. Paul Bar, of Paris, operated last month (July), in a case of sarcoma of the pelvis, and saved both mother and child. This was the second operation in France. The record now stands as follows:

Countries.	No of cases.	Women saved.	Women lost.	Child'n saved.	Child'n lost.	Percentage of women saved.
Germany . .	25	21	4	24	1	84
United States .	5	0	5	2	3	0
Austria . . .	4	2	2	4	0	50
Italy	2	1	1	1	?	50
France . . .	2	2	0	2	0	100
Total . . .	38	26	13	33	4	

Percentage of women saved in all countries, 68.$\frac{8}{19}$
Percentage of women saved in Europe alone, 78

It will be seen that our position is not at all creditable to us as a nation. Standing second in point of numbers, we are least in respect to success, both in the proportion of women, and of children saved. Under an improved system of operating, we are retrograding instead of advancing, and are being left far behind by the Cæsarean operators of countries which, up to twenty-five years ago, had a much higher rate of mortality than existed in the United States. As I have often contended, there is a decided connection between the prior death or destruction of the fœtus and the subsequent loss of the mother; and here we find there has been no exception. To do better in the future, we must bear in mind the importance of making the operation one of choice, and not one of compulsion, after every other expedient has been tried. In a case of pelvic obstruction, first carefully determine the working space; do this early in the labor, and then operate, if the space measures so small that in all probability the Cæsarean section will at the last be a necessity of delivery.

September 11, 1886.

ON THE CAUSES OF DYSPNŒA AND CARDIAC FAILURE IN HIGH ALTITUDES.

BY FRANK DONALDSON, JR., B.A., M.D.,
LATE SCHOLAR IN BIOLOGY, JOHNS HOPKINS UNIVERSITY, AND CHIEF OF CLINIC FOR THROAT AND CHEST, UNIVERSITY OF MARYLAND.

IN the course of some experiments during the past winter, upon the physiological effects of rarefied and compressed air, and reported to the American Climatological Association in May,[1] I was often struck with the fact that sudden and considerable rarefaction of the air produced not only extreme dyspnœa but also a rapid, irregular, and intermittent pulse in the animals experimented upon.

The apparatus used by Prof. Martin and myself was the pneumatic cabinet, at present so much employed for the application of rarefied and compressed air to respiratory diseases, and which is used somewhat indiscriminately, without proper regard to the possible danger of subjecting patients with cardiac disease to treatment by this method. The animals, be it said, were placed in the cabinet in the same manner and subjected to the same changes of pressure as are patients.

In our experiments it was found that:

I. When the animal is breathing air from outside the cabinet, rarefaction of air within the cabinet *causes a marked fall of general arterial pressure*, but has no influence on the pulse-rate.

II. This fall of systemic arterial pressure depends on two factors: greater flow of blood to the skin when the air around the animal is rarefied, and greater accumulation of blood in the lungs when they are distended.

III. Of these two factors, accumulation of blood in the lungs is the more effective; for, if the animal breathes air from the cabinet and not from outside, rarefaction of air within the cabinet (in this case accompanied by no special expansion of the thorax) has but a trivial effect in lowering arterial pressure, unless the rarefaction is very considerable—about what would correspond to three or four thousand feet—when the fall of pressure was more marked.

IV. When the animal is breathing external air, rarefaction of air within the cabinet usually has no effect upon the respiratory rate or the extent of individual respiratory acts, unless the fall of blood-pressure is considerable. *If it is considerable, symptoms of anæmia of the medulla oblongata are seen. In most cases there is more forcible dyspnœic breathing; in some there are dyspnœic convulsions similar to those which occur when an animal is bled to death*, and due to the same cause, viz., deficient blood-flow to the respiratory centre.

So convinced was the writer from these facts, of the danger of this method of treatment that he was led to lay down the following rule, and upon which special stress was laid, viz., before deciding a person to be a proper subject for treatment by pneumatic differentiation, *thorough examination* should be made of the *heart; and that no person found to have insufficiency or stenosis of the mitral or aortic valve, or the slightest tricuspid regurgitation, or a fatty or weak heart, should, under any condition, be subjected to treatment by rarefied and compressed air.*

I was not aware that this point had been emphasized before as to the danger in heart disease of the rarefied and compressed air treatment by this method, and was therefore much interested in Dr. Loomis's paper read before the same Society and just preceding my own. In this article, entitled "The effects of high altitudes on cardiac disease,"[1] Dr. Loomis gives the history of six cases of cardiac failure directly due to removal to high altitudes. He has records, however, of twenty-two. The extreme importance and novelty of these cases entirely justify the insertion here of two.

CASE I.—"In the summer of 1880, during my vacation at St. Regis Lake, in the Adirondack Mountains, I was requested to visit a gentleman who had just arrived from New York and was thought to be dying. I found a gentleman, forty years of age, sitting at an open window, gasping for breath, and deeply cyanosed. No distinct radial pulse could be detected, his extremities were cold, and his body was covered with a profuse perspiration; he was semi-conscious, unable to speak or swallow, and seemed to be dying. Neither heart-sound could be distinctly heard. After the hypodermatic administration of ten minims each of tinct. digitalis and Magendie's solution of morphia, with the free use of hypodermatics of brandy, he rapidly recovered from his extreme condition, and in a few hours was comparatively comfortable, but unable to lie down, and was only partially relieved of his dyspnœa, the radial pulse continuing rapid, feeble, irregular, and intermitting. The next morning I obtained the following history:

"Three days before, Mr. C. had left New York City, feeling well, although for two or three months before he had noticed that he became easily fatigued, had dyspeptic symptoms, lost flesh, and spent restless nights. When he reached Plattsburg the evening before (the altitude of which is 150 feet above sea-level) he felt better than when he left New York, slept unusually well during the night, and started at eight in the morning for St. Regis Lake. When he reached an altitude of about 1000 feet his breathing became difficult, and, as he reached higher altitudes, the difficulty increased, and was accompanied by cardiac palpitation and a sense of oppression in the epigastrium. The dyspnœa and oppression became so urgent before he reached St. Regis (the altitude of which is about 2000 feet) that his friends had to support him, and, when taken from the carriage on his arrival, he was thought to be dying. A careful physical examination twenty-four hours after showed a diffused, indistinct cardiac impulse; the area of præcordial dulness was greatly increased both to the right and left. The first sound of the heart could not be made out; its time was occupied by a loud systolic murmur. The pulse was rapid, feeble, irregular in force, and at times intermittent; fine râles were heard at the base of both lungs. One examination of his urine gave negative results. After treating him for three days, with little apparent improvement in his cardiac symptoms, I advised that he should be taken to a lower altitude.

"When he reached Plattsburg on his return his dyspnœa was markedly relieved; when he reached his country home on the Hudson he had so far improved that he was able to walk on a level, and to lie down with his head and shoulders slightly elevated, although

[1] Preliminary Account of Experiments in regard to the Circulatory and Respiratory Changes observed in Animals placed in the Pneumatic Cabinet, by H. N. Martin and Frank Donaldson, Jr., New York Medical Journal, May 15, 1886.

[1] New York Med. Journal, June 12, 1886.

his dyspnœa, epigastric oppression, and irregular heart-action continued; his feet soon became œdematous, and six weeks later he died with general anasarca and heart insufficiency. No post-mortem examination was made. His family physician told me, some time after, *that he had never detected signs of cardiac disease until his return from the mountains, although he carefully examined his heart two weeks before he started on his summer trip.*"

CASE II.—"Mr. M., aged fifty-two, with recognized aortic insufficiency, which had never given him serious trouble (*in fact, he was not aware that he had cardiac disease*), on the 10th of August, 1882, started with his family on a pleasure trip through the Adirondacks. When he reached an altitude of about 1000 feet he began to suffer with dyspnœa and cardiac palpitation; when he reached St. Regis Lake he was markedly cyanosed, his respiration was gasping in character, and his pulse could not be counted. His apex impulse was diffused and indistinct, and he was having quite profuse pulmonary hemorrhage. I ordered a calomel purge, and ten drops of tinct. digitalis every three hours, which was followed by marked relief within twenty-four hours, although his dyspnœa and cardiac symptoms were not sufficiently relieved to allow him to lie down. A physical examination showed extensive cardiac enlargement, a diffused and indistinct apex beat, a feeble and irregular heart-action, an absence of the muscular element of the first sound, but no murmur could be detected. The urine contained albumen, but no casts; crepitating râles were heard over the base of both lungs. I advised that he return immediately to his home in Brooklyn, which he reached, the third day after, very much improved. His dyspnœa was so much relieved that he was able to lie down; his feet and legs soon became œdematous, general anasarca followed, and in two months he died suddenly. No autopsy was made, and I could get no intelligent account of the immediate cause of his death."

Dr. Loomis then goes on to say,

"In these cases which I have quoted, as well as similar ones which have come under my observation, *the ventricular dilatation*, which was unquestionably the cause of the sudden development of the distressing symptoms, and from which dated the commencement of the fatal issue, seemed to be directly due to the effects, on the *cardiac circulation, of the change from a low to a high altitude.* I do not maintain that sudden cardiac dilatation might not have developed in any one of these cases under other conditions, but I do maintain that change in atmospheric pressure is a very important cause of sudden ventricular dilatation when any degree of heart insufficiency preëxists."

Finally, he declares that only with danger can a person whose heart is weak, fatty, or diseased, pass rapidly from a low to a high altitude, and, indeed, I gathered from his subsequent remarks that a person with cardiac disease should under no circumstances be sent to high altitudes.

Dr. Loomis then, had arrived at the same conclusion from clinical experience as the author had experimentally, and it seems that we may rest assured that there is great danger for the diseased heart either in high altitudes or in any form of treatment by rarefied and compressed air. This fact being established, our purpose is to inquire into the cause of dyspnœa and cardiac failure under these conditions.

To do this it will be necessary, first, to give the latest accepted explanation of the circulatory changes which take place in ordinary quiet respiration of air at normal pressure—750 millimetres of mercury—and then to see how high altitudes may affect these normal respiratory and circulatory phenomena.

It is very generally stated that the cause of dyspnœa and shortness of breath in high altitudes is the want of oxygen; that the system needing oxygen, more blood has to be sent through the lungs in a given time, thus increasing the amount of work to be done by the heart, which often dilates under the sudden strain. Such explanation, though applicable for very high altitudes, is at the same time based on a misconception.

1st. The partial pressure of oxygen at normal atmospheric pressure is equal to 152 millimetres of mercury.

2d. So long as the partial pressure of this gas remains above 25 millimetres of mercury (one inch) the amount taken up by the blood will depend upon the amount of hæmoglobin in that liquid, and not on how much oxygen there is in the air.[1]

3d. The partial pressure of oxygen even at so great a height as 10,000 feet would be 101 millimetres of mercury, at which the hæmoglobin could get all the oxygen necessary.

But it may be urged, Paul Bert found an increased amount of hæmoglobin in the blood of animals in high altitudes, which would show a necessity on the part of nature for more oxygen. True, but this change takes place only after a very long time, probably not in one generation. Again, it may be objected that in many of those very cases sent to high altitudes the blood is poor in hæmoglobin. Doubtless this is true, but it is not the sick only, by any means, who suffer from dyspnœa and cardiac failure in high altitudes.

It is not necessary in this article to go into the various theories of the aspiration of the thorax, advanced by Poiseuille, Quincke and Pfeiffer, Funke and Latschenberger, Bowditch and Garland, Mosso, Hegel and Spehl, and others. I shall refer only to the work of de Jager, whose explanation of the respiratory phenomena has, on the whole, the greatest experimental proof to support it.[2]

As to the influence of the normal respiratory movement upon the circulation. In any given inspiration the chest cavity is enlarged, negative pressure is created in the thorax; not only the lungs, but the right side of the heart and the intrathoracic portions of the systemic veins, are expanded in consequence, and the blood is drawn toward the great veins and right side of the heart. Such being the general effect of negative intrathoracic pressure, what is its effect upon the blood-flow through the lungs, upon the intrathoracic vessels, and finally upon the systemic circulation?

De Jager holds that though the negative pressure is exerted equally on the pulmonary artery and vein, the effect upon the blood in each is very different,

[1] Martin, Human Body, p. 384, 1st edition.

[2] For the *résumé* of the work of de Jager, with a critical examination of his theory, I am greatly indebted to my friend, Dr. W. H. Howell, of Johns Hopkins University, who kindly allowed me to make use of his lectures on the aspiration of the thorax.

for the walls of the pulmonary artery are much thicker than those of the pulmonary vein, and any want of pressure would be transmitted through them upon the blood much less readily. Again, the walls of the pulmonary artery are normally distended by a pressure of from 30–40 millimetres of mercury, and so the slight increase of negative pressure occurring during inspiration would probably have little or no effect in distending the pulmonary artery. On the other hand, the blood in the pulmonary vein is under little, if any, positive pressure, and so diminution of pressure would distend its walls considerably. De Jager, therefore, holds that we would have the normal conditions during life more nearly represented if, in an artificial thorax, the pulmonary vein should be exposed to the same negative pressure as that expanding the lungs, while the pulmonary artery was left under a constant pressure of one atmosphere, for instance.

Experimenting in this way, he found that the stream velocity (the amount flowing from the pulmonary vein in fifteen seconds) is markedly greater during *expansion* than during *collapse;* the effect then of normal inspiration, on the whole, is to increase the quantity of blood flowing through the lungs, probably by increasing their capacity, and thus diminishing the resistance to the flow. De Jager, in his second paper, gives the final opinion that "the respiratory waves in the blood pressure in the dog in normal quiet respiration are caused by changes in lung circulation. The first sinking of pressure at the beginning of inspiration is a capacity curve—*i.e.*, due to increased capacity of the lung vessels; the following rise, a stream velocity curve"—*i.e.*, caused by an increased flow through the lungs. In a like way, the rise at the beginning of expiration is a capacity curve—*i.e.*, owing to a diminished capacity; the succeeding fall, a stream velocity curve, due to diminished flow through the lungs.

The influence of respiration upon the heart and great vessels. The first effect of the negative pressure of inspiration is a diminution of pressure on the heart and intrathoracic vessels, and a consequent *sucking* of blood into the right side of the heart, which in turn is sent through the increased area of the lung vessels to the left heart, and thence to the systemic circulation, causing a rise of pressure. Another important element in the respiratory waves of blood pressure is the change which takes place in intra-abdominal pressure in inspiration. Luciani and Schweinberg maintain that the descent of the diaphragm causes increased abdominal pressure, which assists the rise in arterial pressure, 1st, by driving the blood out of the abdominal veins toward the heart; 2d, by compressing the abdominal arteries (a questionable supposition), Another cause of increased pressure during inspiration is the increase of heart rhythm, due, according to Fredericque (*Archives de Biologie*, 1882), to a rhythmic automatic discharge from the cardio-inhibitory centre—the discharge depending in some way on the rhythmic discharge from the neighboring respiratory centre.

The effects, then, of the negative pressure following inspiration, are an increased blood-flow to the large intrathoracic veins, and to the right heart; an increased heart capacity, especially of the right side; an increase in intra-abdominal pressure, forcing onward the blood; an increase of capacity in the pulmonary veins; an increased blood-flow through the lungs and to the left heart; an acceleration of the heart rhythm, and, finally, increase of systemic arterial pressure.

Such, in brief, is the theory of the circulatory changes which take place in ordinary respiration. It remains for us to inquire how the cycle may be affected in high altitudes.

However much the phenomena of normal quiet respiration may be changed in a highly rarefied atmosphere, the chief and immediate cause of dyspnœa and cardiac failure, may, I think, be traced to *the diminished pressure on the heart walls and their consequent dilatation.* This fact may be made plain as follows:

The external air presses against the interior of the lungs with a pressure equal to that exerted on the same area by a column of mercury 760 millimetres high, it distends them and pushes them against the inside of the chest walls, the heart, and great blood-vessels and contents of the thorax. The pressure thus exerted is not equal to that of the external air, since some of the total air pressure on the inside of the lungs is used up in overcoming their elasticity (equal to six millimetres of mercury), and it is only the residue, equal to a column of mercury 754 millimetres high, which pushes the lungs against the heart and great vessels. The actual pressure then on the heart walls, normally, is equal to 754 millimetres of mercury.

How is this pressure changed at an altitude, say of 10,000 feet? The total pressure of the air at that altitude would be equal to a column of mercury 501 millimetres high. The pressure, then, upon the lungs and whole body would be lessened. But, as the person is breathing the same air as that around him, the respiratory act would be unchanged. Prof. Martin and the author found that neither the frequency nor depth of the respiratory act were changed in an animal placed in a rarefied atmosphere. There would be (as, again, we found) a slight fall in blood pressure, which would be very temporary, for the circulation being a system of closed tubes, is but little, if any, affected, and the pressure rises at once to the normal, owing to increased vasomotor action. There would be no increase of negative intrathoracic pressure. Finally, the only organ directly affected at moderate altitudes (of course, at very high altitudes, 12,000 to 18,000 feet, the dyspnœa from want of oxygen would be felt), say from 3,000 to 10,000 feet, would be the heart, and for this reason. As we have said, the pressure on the heart usually is equal to 754 millimetres of mercury. At an altitude of 10,000 feet, however, the general pressure being 501 millimetres, the pressure of the heart would be only 495 millimetres of mercury. Now the arterial pressure, and, therefore, the intracardiac pressure would be the same as when the pressure on the heart walls was 754 millimetres. But one result could follow such conditions, and that would be a stretching and dilatation of the heart walls—especially of the right

side—and this is precisely what is found in many of those who go into high altitudes for their health, or for other reasons, and what we found in experiments upon animals. The heart, weak and diseased possibly beforehand, is unable to stand such strain as is put upon its dilated walls, and so we find its contractions weak, intermittent, and irregular—we have the murmurs, the syncope, the dyspnœa, which are often so marked in high altitudes.

Of course, the want of oxygen is a great cause of the dyspnœa in very high altitudes, but we are quite justified, on physiological grounds, in saying that at the altitudes to which persons are ordinarily sent—three, four, six, seven, or even ten thousand feet—the hæmoglobin can take up all the oxygen the system needs.

Finally, then, and speaking purely from an experimental standpoint, I hold that there is danger to the weak and diseased heart, not only in the use of such apparatus as the pneumatic cabinet, but also in high altitudes; in which conclusion I am supported by the clinical experience of Prof. Loomis, and of Dr. Solly, of Colorado Springs.

MEDICAL PROGRESS.

A CHEMICAL STUDY OF RABIC VIRUS.—VINCENT RICHARDS, whose studies of venom are well known, has pointed out in the *The Indian Medical Gazette* of July, 1886, certain analogies between the poisons of snake bite and of rabies. His paper concludes as follows:

Saliva is, as we know, of a mixed character—that is, it is a combination of secretions from the parotid, submaxillary, sublingual, and buccal glands. These secretions differ in their degree of viscidity, and in their chemical composition, and as the flow of saliva from the different glands—especially the parotid and submaxillary—is considerably influenced by circumstances, the mixed saliva must vary from time to time in the proportion of its several constituents.

It contains, amongst other substances, two proteid bodies, viz., globulin and serum-albumen, and it so happens that these are two of the toxic elements in snake-venom; the globulin attacking certain centres of the medulla oblongata, and the albumen producing motor paralysis. Now, bearing in mind this fact and the circumstance that two distinct types of the disease result from the inoculation of rabic virus, is it not possible, nay, very probable, that the distinctive character of the phenomena in each case depends upon, or results from the inoculation of two or more noxious principles differing in proportion one to another, and to the fluid in which they are found? It may possibly be found that virulence of the saliva results merely from an enormous increase in the proportion of these two elements. I do not say that these, what I will call rabic proteids, have an identical physiological action with those of snake-venom proteids. Indeed, in some particulars, they would seem to exercise some unknown antagonistic action on the same nerve-centres. For the purposes of this paper, I suppose that we have at least two toxic elements of a proteid character in the rabic slaver, and I further assume that one is—

Rabic globulin—having an action upon certain centres of the medulla oblongata, especially the respiratory centre with its neighboring convulsive centre, the cardio-inhibitory centre, the centre for reflex excitation of the secretion of the saliva, and the centres for deglutition and vomiting, and destroying the coagulability of the blood.

And the other—

Rabic albumin—having a special action, more particularly on certain centres of the anterior, temporal, and posterior lobes of the cerebrum.

Assuming that these toxic elements may be present in the saliva of the rabid animal in varying proportions—sometimes one and sometimes the other preponderating—the peculiarities of the disease—hydrophobia—are accounted for. Though it is true that my contention is mainly hypothetical, still it has the merit of affording the best solution of an otherwise perplexing and insoluble problem, as to how the inoculation of the rabic virus can be the cause of two distinct series of physiological phenomena. Whether it is as true as it is plausible remains to be proved. In the meantime, I commend my views to the consideration of those experts in physiological chemistry who may have the necessary opportunity of submitting them to experimental test.

TREATMENT OF PRURITUS.—A solution of menthol, two to ten grains in the ounce, is said to be a very effectual remedy in the treatment of the troublesome itching which accompanies urticaria, eczema, and pruritus.—*British Medical Journal*, August 28, 1886.

INTRAPERITONEAL INJECTIONS IN ACUTE HEMORRHAGE.—RÜTGERS records the case of a woman who, as a result of post-partum hemorrhage, was in a state of profound collapse, and whose veins, after ligature, did not swell, so that no indication for the site of an intravenous injection was obtainable.

A solution of sodium chloride 90 grains, sodium hydrate 5 grains, and distilled water 34 fluidounces, was accordingly introduced into the abdominal cavity by means of a trocar. After three days, during which abdominal pain and subnormal temperature obtained, the general condition was excellent.

It is evident, from this experience, that the absence of swelling in veins after ligature is no sure sign of actual death, and it is suggested that the method described may replace that of hypodermatic injection of water in Asiatic cholera.—*Centralb. f. d. med. Wiss.*, Aug. 7, 1886.

THE TREATMENT OF ARTERIO-VENOUS ANEURISM.—A long paper on arterio-venous aneurism communicated by DR. F. BRAMANN, of Berlin, to the Fourteenth Congress of the German Society of Surgery, concludes with a comparison of the results of different methods of treatment. The tables of 159 cases collected from different sources show, the author states, that digital compression and other bloodless methods, though occasionally successful in the treatment of arterio-venous aneurism, have not been attended, on the whole, with satisfactory results. Digital compression is very uncertain in its effects, and, to be practised with any chance of success, demands much patience and endurance on the part of both patient and surgeon. It must, therefore, stand below operative methods, by which it is far surpassed with regard both to certainty and

rapidity of the curative results. As a preparatory and auxiliary means of treatment, however, digital compression cannot be too highly recommended; since by it the collateral circulation may be established, and serious circulatory disturbances on the subsequent application of the ligature be thus prevented. Reference is made to cases in which, after a first compression of the carotid artery, lasting one or two minutes, had caused vertigo and syncope, the tendency to such attacks was gradually removed by frequent repetition of the treatment, and consequent dilatation of the collateral channels.

In the operative treatment of arterio-venous aneurism, Hunter's operation is to be rejected. The most promising method is ligature of the vessels above and below the lesion with total or partial extirpation, or, in some cases, with simple division of the sac. It is necessary in most cases to lay open the sac, in order that the opening of any lateral branch in the region of the vascular communication and between the ligatures may not be overlooked. In every case of recent wound of a large artery with its vein, in which the nature of the injury is manifested by free bleeding, a characteristic murmur, and alterations of the pulse, the vessels should be tied at once above and below the seat of injury and divided between the ligatures, and at the same time the wounded portions of artery and vein should be cut away. In cases in which the wound has healed and an arterio-venous aneurism been fully developed, an attempt may be made, though not for long, to treat the lesion by continuous or intermittent digital compression. If this fail, ligature of the vessels above and below the seat of injury is to be recommended, together with complete extirpation of the sac when this is small and circumscribed, and either partial extirpation or simple incision, followed by plugging, in case of a very large sac or of one with ill-defined wall.

The only contraindication of operative treatment is extreme general disease of the vessels, especially advanced arterial sclerosis. Long duration of the aneurism does not in itself contraindicate such treatment. A case has been recorded of successful treatment by operation of an arterio-venous aneurism in front of the elbow, that had lasted for twenty-five years, and another of a like aneurism of the femoral of twelve years' standing. With regard to the dilatation of the veins in the affected limb, this always diminishes considerably in size after the operation, and may even disappear altogether. Occasionally, however, after the patient has recovered and taken to active muscular exercise, circulation is reëstablished in these veins, and dilatation is again observed. This venous dilatation, however, Dr. Bramann states, does not attain so high a degree as to interfere with the functional activity of the limb.—*London Medical Record*, July 15, 1886.

TREATMENT OF HYDROPHOBIA IN POLAND.—A Polish physician, PRINCE IGNACE JAGELL, has been occupied since 1858 in the study of hydrophobia, and in a recent letter to the French Academy combats the methods and conclusions of Pasteur. Prince Jagell states that he has treated, in the course of his life, eighty-eight individuals bitten by mad dogs and wolves, and that all were cured by the internal administration of an infusion of the bark of the *Spirea filipendula*. Twenty-eight of the patients were already in the first period of hydrophobia when the treatment was begun.

Several German journals have commended the same drug as a prophylactic in the disorder under consideration.—*Rev. de Thérapeutique*, August 15, 1886.

REFRACTIVE CHARACTER OF THE EYES OF MAMMALIA.—In the course of an elaborate article with this title in *The Royal London Ophthalmic Hospital Reports* for July, 1886, DRS. LANG and BARRETT write as follows:

"The usual form of an astigmatic eye—a vertically flattened sphere—is the shape that a soft ill-supported sphere would assume by reason of its own weight. When such a sphere is acted upon by four muscles vertically and by only two horizontally, leaving aside any influence the lids may exert, it is readily conceivable that a weakly formed sclerotic and cornea should assume the astigmatic shape. Once formed, this shape would have a tendency to be inherited, especially in domestic animals, amongst whom the law of the survival of the fittest does not obtain, at least as regards the eyes. In albino rabbits, which do not admit of much crossing, this defect was always marked, the astigmatism in our cases averaging 1.275 D.

"On only one point, however, is the evidence decided and convincing; the principal meridians of the astigmatic eye are always in the direction of and at right angles to the direction of the long axis of the pupil, to this extent only does this evidence justify the consideration of the matter from a teleological standpoint. Were the slit-like pupil developed to obviate the evil results of the astigmatism, we should expect to find that the meridian of least curvature in myopic, and of greatest curvature in hypermetropic eyes, corresponded in direction with the long axis of the pupil. One would also certainly expect that animals with round pupils should not possess very astigmatic eyes. Yet every one of these requirements is unsatisfied, and we find throughout that the optical construction of these eyes evinces the existence of some general developmental agency which pays little regard to the *existing* shape of the pupil.

"We feel that we are quite unable in the present state of our knowledge to conjecture the mode of origin, or even the possible purpose of this slit-like pupil, but we think that the evidence adduced indicates the probability of that explanation being obtained from a developmental and not from a teleological standpoint."

SUDDEN DEATH FROM A BLOW ON THE TESTICLES.—At a recent meeting of the Varna Medical Society, DR. IVANOFF recorded the following rare case (Bulgarian *Meditzinsko Spisanïe*, June 20, 1886, p. 440). A man, aged between forty-five and fifty years, fought with a woman on the street. During the fight the woman dealt a violent blow on his genital organs. The man shouted, 'I am dying!' staggered, and fell insensible. The author, who was almost immediately fetched to the spot by a policeman, found the patient lying on his back, motionless, pulseless, and breathless; his face, neck, and scrotum being very red. Not a trace of ecchymosis or any other sign of injury was detected anywhere in the man. Since there seemed to be heard a slight cardiac murmur, and a slight tremor to be felt in the carotids, Dr. Ivanoff without any delay resorted to

artificial respiration. But neither forty-five minutes' manipulations nor electrization could establish the man's breathing. The congested parts soon became livid, and every sign of life extinct. At the *post-mortem* examination, there were found only intense congestion of the meninges and brain, congestion of the lungs with numerous punctiform ecchymoses, accumulation of dark red fluid blood in the cardiac cavities, congestion of the stomach, liver, kidneys, and testicles. Everything else was quite normal. Basing this conclusion on all the facts as sketched above, the author stated (forensically) that death followed from syncope, which had been brought about by sudden violent pain caused by a blow on the testicles.—*London Medical Record*, August 16, 1886.

RESEARCHES ON MYOHÆMATIN AND THE HISTOHÆMATINS.—DR. C. A. MACMUNN (*Proc. Roy. Soc.*, 1886, 240) has found that the organs and tissues of invertebrate and vertebrate animals, from echinoderms to man, present a series of spectra which are all evidently connected with each other. In general the spectra may be said to consist of three bands—one before D, one or two between D and E, and sometimes one or two others nearer violet. The pigments to which these spectra are due are called histohæmatins, and occur in an oxidized and deoxidized condition. In all animals which possess striped muscle there is to be found in their tissue a yellow or reddish-yellow pigment—myohæmatin—distinguished by the sharpness and narrowness of its bands. Three bands are always present—one between C and D, close to D, which corresponds to the first band of the histohæmatins spectrum; two very narrow and sharp bands between D and E, and one or two nearer violet, not constantly present. Dr. MacMunn concluces that these pigments are concerned in the internal respiration of the tissues and organs in which they are found. Hæmochromogen has been found by the same indefatigable observer in the suprarenal capsules of several animals. This pigment would appear to be here, as in other places—*e.g.*, the bile—excretory. Hence one of the functions of the suprarenal capsules is to cause a downward metamorphosis of hæmoglobin and the histohæmatins. If from disease this metabolism is prevented, the incompletely metabolized pigments circulate in the blood, and staining of the skin and mucous membrane, as in Addison's disease, may take place. Dr. MacMunn has found in the urine of Addison's disease such an imperfect metabolit.—*Dublin Journal of Medical Science*, Sept. 1886.

POTASSIUM PERMANGANATE IN BURNS AND FROST-BITE.—In the *Meditzinsko Obozrenië*, 1886, No. 8, p. 758, DR. A. A. ZÜBOFF writes that, having tried permanganate of potassium in forty-four cases of burns and thirteen cases of frost-bite, he arrived at the following conclusions: 1. Permanganate of potassium, in the shape of frequently changed compresses (linen or hygroscopic cotton-wool soaked in a solution of one or two grains to an ounce of water) is an effective remedy for frost-bite of the first and second degrees. 2. The same lotion acts as successfully in burns of the first degree. 3. It is less successful in burns of the second degree. At all events, the permanganate lotion rapidly relieves inflammation around blisters, and pain, and prevents suppuration when blisters remain intact. In this category of cases, it is advisable to employ a weaker solution (half a grain, or even less, to an ounce). Two cases are given in detail. One of the patients received (when taking a vapor-bath) a scald of the first degree, extending from the breasts to the inguinal folds anteriorly, and between the same levels posteriorly. Pain disappeared within an hour after the application of the permanganate lotion. Soon the epidermis began to peel off. She left, well, in eleven days. Another woman had a similar scald of the face and a hand. She also obtained rapid relief, the treatment lasting a week.—*London Medical Record*, August 16, 1886.

THE TREATMENT OF PERICARDITIS.—PROFESSOR NOTHNAGEL, of Vienna, in a clinical lecture on the treatment of pericarditis, advises that in cases where there is pain in the cardiac region, fever, and the commencement of exudation, leeches varying in number from three to ten, according to the gravity of the symptoms and the constitution and strength of the patient, should be applied. The leeches should be renewed every four or six days. Cupping may be substituted, but leeches are preferable. An ice-bag should be applied, or a directing apparatus through which cold water can be constantly supplied to the part. Cold compresses are of no use unless they are laid on ice, and then they must be changed every five minutes. Digitalis for internal use is indicated under certain circumstances. It is useful if the cardiac action is greatly increased, especially if there are signs of the heart muscle becoming implicated, when it should be given in somewhat larger doses. Digitalis is not desirable in the earlier stages of the disease, but in the later ones, when there are signs of weakness of the heart muscle and the pulse is weak, it is indispensable. Other internal remedies are useless. Mercurialization—viz., calomel in small doses of three-quarters of a grain internally, and gray ointment externally—has no effect. The pain is scarcely ever severe, and if it is persistent it may be relieved by cold and bloodletting. To this a high temperature is no drawback, as the fever subsides as the inflammatory appearances disappear. If effusion has begun, other means must be used—such as counter-irritation of the skin and the promotion of reabsorption. Ice and bloodletting are of no use in this case. The cardiac region must be painted with equal parts of gall and iodine tincture, or an ordinary cantharides plaster may be applied, which should be kept on from eight to twelve hours—till a blister is raised. This is of greater use in subacute than in acute pericarditis. Digitalis does not promote reabsorption directly, but indirectly by its influence on the action of the heart. Should the patient's life be threatened by copious effusion, paracentesis of the pericardium must be performed. This operation is often employed, and with not unfavorable results. Great care must be observed; the pointed trocar of Dieulafoy's apparatus must not be used, but a blunt one like that of Dr. Fraentzel.—*The Lancet*, September 4, 1886.

THE THERAPEUTIC ACTION OF CHLORIDE OF SODIUM.—After dealing with the physical and chemical properties of this salt, and its physiological action on

animals and plants, DR. BRANCHE gives the results of his own observations in man. The blood, the saliva, and the urine show a notable increase in the proportion of the salt a few minutes after its ingestion. Its effect on digestion is not only to augment the secretion of gastric juice, but also to increase its acidity. After taking ten grammes daily, more than the usual quantity, for two months, the number of blood corpuscles was found to have increased, with a diminution of the albumen and watery constituents of the blood. The excretion of urea is increased, owing either to better diffusion or to acceleration of organic combustion. With ten grammes daily in addition to the ordinary consumption of salt, the amount of urea was augmented to the extent of four grammes (Rabuteau). Although certain advantages appear to follow a slight increase in the quantity of salt taken, an excess is certainly injurious; in one case death followed the ingestion of 500 grammes of sea salt. This toxic effect, however, has been denied. Deprivation of the ordinary ration of salt is rapidly followed by general feebleness, albuminuria, and anæmia. The condition likely to derive most benefit from a course of treatment with chloride of sodium is (according to Dr. Branche) struma, but anæmia and tuberculosis are also improved, if not cured. Dr. Pidoux recommends phthisical patients to eat largely of salt at meals. Goat's milk, rendered saline by the addition of twelve to fifty grammes of salt to the diet of the animal daily, is highly spoken of. Bouchardat has remarked that well-salted meat diminishes the thirst of diabetic patients to some extent, and lessens the excretion of sugar. In the form of baths its good results are well known in the treatment of chronic rheumatism, gout, gravel, and biliary calculi. Several observers have seen malarial fever arrested by doses of salt varying from ten to fifteen grammes. In solution, it has been recommended for intravenous injection for cholera, and to destroy the *oxyuris vermicularis* in children. The effect of salt is antidotal to nux vomica and curare, and to lead and silver salts. The necessity for avoiding the ingestion of salt in any form for some hours after the administration of calomel is, or should be, well known. In conclusion, Dr. Branche points out the benefit to be derived from the use of mineral waters of the Friederichshall type, containing chloride of sodium, whereby the depressing effects of saline laxatives is counteracted by the salt.—*London Medical Record*, July 15, 1886.

MYDRIATICS IN OPHTHALMOLOGY.—In a lecture thus entitled, which is published in the *Twenty-Second Annual Report of the Alumni Association of the Philadelphia College of Pharmacy for 1886*, DR. S. D. RISLEY presented the following conclusions:

1. That the sulphates of atropine, duboisine, and hyoscyamine, and the hydrobromate of homatropine, are efficient agents for paralyzing the accommodative function, and in the treatment of asthenopic eyes.

2. That in the employment of the last three named the duration of the treatment is very much shortened.

3. That, for the correction of anomalies of refraction in otherwise normal eyes, the homatropine is to be preferred.

4. That if retino-choroidal disturbance is also present, hyoscyamine or duboisine is preferable: (*a*) to atropine, because of the shorter duration of the treatment; (*b*) to homatropine, because of their more persistent control over the ciliary muscle.

5. That hyoscyamine is preferable to duboisine, since the tendency to systemic poisoning is less.

The preparations of hyoscyamine which have of late been furnished me, have seemed more persistent in their control of the accommodation than those first employed. In a few instances this has been so markedly the case as to justify the suspicion that atropine had been used to substitute or adulterate the hyoscyamine, or that some other alkaloid was present in the hyoscyamus, which, in the process of manufacture employed by some chemists, was not eliminated from the hyoscyamine.

INFANT FEEDING.—DR. E. P. THURSTAN writes as follows to *The Lancet* of Sept. 4, 1886. The vendors of the various foods for infants lay great stress on the fact that the starch of the wheat has undergone some change which renders it easier for digestion. This may be true to some extent; the diastase, when present, may convert a portion of the starch, but this (in the early weeks of life, at all events) is probably a secondary function. The following case which has recently occurred in my practice will illustrate my views, and, I think, confirm their correctness:

The wife of a well-to-do tradesman was prematurely confined of a female child nine weeks before she was expecting it; the presentation was breech and footling. When the child was born, it was cyanosed and made no attempt to breathe. After performing artificial respiration for five minutes the breathing became fairly established; but the child was still cyanosed, and did not cry. I cut the cord and bled the child to two drachms, after which it cried fairly strongly. The mother had never been able to nurse her children, and no attempt to do so was made now. It was fed on milk and water, half and half of each. The weather being hot, we had no difficulty in keep up the warmth of the child, and for a few days all went well, except that the child could not be induced to drink more than half a pint of milk daily. Three days after birth it weighed 3 lb. 8 oz. A week later it weighed 3 lb. 9½ oz. In the meantime the cord and surrounding rag had come away, so that the actual gain could not have been more than an ounce, probably less. Shortly after this, sickness and slight diarrhœa came on. Veal-tea was ordered with the milk, and cream and water twice a day, instead of entire milk and water. Some powders were given, containing a third of a grain of mercury and chalk, with a little aromatic confection, ipecacuanha, and rhubarb. The diarrhœa and sickness abated, but the child was still taking very little. Eight to ten drops of brandy were added to the milk three times daily. At the end of another week the weight was 3 lb. 10 oz., being a gain of only ½ oz. The child was now fed on milk, thickened with a little patent farinaceous food. The following week the weight was 4 lb., the gain being 4 oz. The week after, the weight was 4 lb. 9½ oz., being a gain of 9½ oz. The child is now doing well.

Here is surely a clear case of a life preserved by a change of diet, and a change, too, from a diet which I may call orthodox to one that is often spoken of as absolutely injurious.

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OPERATION FOR MALIGNANT DISEASE IN THE THROAT.

THE subject of the treatment of malignant disease in the throat has attracted much attention during the past few years, and in this country became of peculiar interest a short time ago on account of the sufferings and death of General Grant. On March 21, 1883, we gave an editorial *résumé* of the facts and opinions then accessible in regard to it. But the subject is of sufficient importance to justify our recurring to it, especially as a number of valuable contributions to its literature have recently appeared.

The history of modern operations for the removal of malignant growths involving the tonsils, soft palate, tongue, and floor of the mouth—as distinguished from those implicating the larynx, which form an interesting chapter by themselves—may be said to begin with the courageous and successful removal of such a growth by external incision by CHEEVER, of Boston, an account of which he published in the *Medical and Surgical Reports of the Boston City Hospital*, first series, 1870. In this case he made an incision along the base of the jaw, meeting another one parallel to the sterno-mastoid muscle, and enucleated the morbid growth. After the publication of this case, it was claimed that both Langenbeck and Hueter had operated in a similar way in 1865, combining division of the lower jaw bone with the incisions in the soft parts. But no report of these operations had been published at that time. Resection of the jaw bone to facilitate access to a malignant growth of the isthmus of the fauces, was first practised by Billroth, in two cases, in 1861, and next by Boeckel, in 1863. In 1878, Cheever reported in the *Boston Medical and Surgical Journal*, a second case, in which he operated by external incision, and divided the jaw also. In this operation he did a preliminary tracheotomy, and sutured the jaw bone with wire. This patient also recovered, although the morbid growth soon recurred.

In 1883, POLAILLON did the first of six operations for malignant growth of the throat, which is fully reported, with other cases, in the *Gazette Médicale de Paris*, July 17, 24, and 31, 1866, adopting in three cases the plan of resecting part of the lower jaw, and in one, of simply dividing it. Four of his patients died on the 3d, 4th, 18th, and 47th day after the operation, and two recovered, one to die the next year of recurrence of the tumor, and one in four months from a like cause. Polaillon practised preliminary ligation of the external carotid artery in five cases, two of which recovered, and three were fatal. In one case he ligated the common carotid artery, and the patient had paralysis of the opposite side, which persisted until he died of secondary hemorrhage on the 47th day, after a second ligation of the same vessel. As early as 1836, Velpeau, before removing through the mouth a cancer of the fauces, passed a thread around the common carotid artery, so as to be prepared for any excessive hemorrhage which might occur. As no such hemorrhage took place, the thread was removed on the day after the operation.

In 1883, MIKULICZ did the first of four operations for malignant disease of the throat. In this he resected the ascending ramus of the lower jaw bone. His patient made a good recovery in six weeks, but had a recurrence of the growth two years afterward. This fact, together with a report of the three other operations for the same disease, is recorded in the *Deutsche med. Wochenschrift*, Nos. 10 and 11, 1886. Of these three patients, one died of exhaustion in two and a half hours, one recovered in four weeks and died of recurrence in three months; and in one Mikulicz was not able to remove a portion of the growth which occupied the posterior nares, and which progressed in spite of the operation.

In 1884, KENDAL FRANKS reported in the *Lancet* of June 28, an operation for the removal of the tongue, left tonsil, and part of the soft palate for cancer. He made the incision from the angle of the mouth backward and through the cheek. His patient died of recurrence, nine weeks after the operation.

On June 16, 1886, VERNEUIL reported to the Societé de Chirurgie, of Paris, an operation which he did in February of this year for an adeno-myxoma of the pharynx attached to the basilar bone. A few days after a preliminary section of the soft palate, made for diagnostic purposes, he made an incision from the angle of the mouth down to the lower border of the jaw and then along this border to its

angle. Turning up the flap, he sawed through the bone at the site of the groove for the facial artery, and removed the tumor. He left the wound open, and dressed it simply with a solution of phenic acid. The wound always looked well under the influence of frequent washings and spraying with phenic acid solution; and the patient was able to feed himself without the use of a tube. But he became discouraged, would not eat enough, and died two months after the operation. Verneuil's plan of leaving the wound open to facilitate its disinfection has been sharply criticised, and has not been imitated.

One of the most valuable contributions to the literature of the subject is an elaborate paper by CASTEX, in the *Revue de Chirurgie*, for Jan., Feb., and April, 1886. In this paper the nature and treatment of malignant tumors of the throat are fully and ably discussed. Another important study of the subject is contained in the thesis of PAUL FAURE, "*De l'epithelioma du plancher de la bouche*," published in 1884. We have space at present only to refer to these, and to the interesting discussions as to the value of tracheotomy in operations for tumors of the throat before the Société de Chirurgie of Paris, in the beginning of this year, in which Monod, Verneuil, Trélat, Polaillon, and Le Fort took part.

Malignant growths in the throat are fortunately very rarely met with. By a combination of various statistics they appear to occur only about once in 1000 cases of malignant growths in all situations. When encountered, they should, if possible, be removed early and radically. An operation is plainly indicated when such a growth is isolated, circumscribed, movable, and unaccompanied by glandular involvement. An operation is justifiable when the growth is more extensive, and when there is moderate glandular involvement. It is forbidden when to the conditions just stated is added advanced cachexia.

Unhappily, there is not much evidence as to the final result of operations undertaken before the disease has made decided progress. And still more unhappily, there is scarcely any reason to expect a cure at a later period. Of the cases we have mentioned above, not one is known to have lived more than a few years, and almost all died of recurrence within a few months after the operation. The best results on record occurred in a case of sarcoma of the tonsil, operated upon by Genzmer, by external incision, in 1869, which showed no trace of recurrence three years afterward; and in a case of tumor of the tonsil and soft palate removed by Rizzoli, through the mouth, in which there was no recurrence twenty-four years after operation. But there is no positive evidence as to the nature of this tumor. Nevertheless, we believe operation to be justifiable in a considerable number of cases. There is a small hope of prolonging life for some months, or even for one or two years. And there is almost a certainty, if the patient survive the operation, that his condition will be materially improved. As Gosselin has said, in speaking of operations for the removal of cancer of the breast, "It is much to substitute a wound which is seen to heal for a disease which is seen to increase incessantly." And, even if the hope infused by a seemingly successful operation prove delusive, still it is a blessed delusion to the patient.

Finally, as to the proper method of operating: it appears, from the experience so far accumulated, that the best plan is to operate from the outside of the neck, as has been done by Cheever, Polaillon, Mikulicz, and others. An incision may be made in front of the sterno-mastoid muscle, from the mastoid process to the hyoid bone, and another from the upper end of the former along the base of the jaw. After clearing and raising the flap, the lower jaw may be divided or resected, and the growth enucleated, or excised with the galvano-cautery wire and the thermo-cautery knife. After controlling any hemorrhage which may occur, the flap may be replaced and sutured, leaving an iodoform tampon inside the mouth, attached by a thread to another on the outside in such a way as to effect compression. The throat must be frequently and thoroughly disinfected. The patient may be nourished through an œsophageal tube—which should be inserted while the patient is still under the influence of the anæsthetic—or by nutritious enemata, or in both ways.

The value of preliminary tracheotomy in these operations is not clear, but it may be resorted to in order to prevent the access of blood and débris to the lungs during or soon after the operation.

Ligation of the carotid artery adds a new element of danger to the operation, and we cannot see that it improves the chances of recovery. This seems to be proved positively by the experience of Polaillon, and negatively by that of other operators.

In conclusion, a remark as to the diagnosis of malignant growths in the throat may not be amiss. Before ulceration takes place, it is easy to make a mistake in this respect. As late as 1885 Mikulicz operated on a case which he supposed to be one of carcinoma of the tonsil, and, after removing an enlarged gland which *was* carcinomatous, he found the tonsil smooth, soft, and healthy, and was able to spare his patient the intended resection of the lower jaw and pharyngotomy. And years before, Blandin mistook a syphilitic ulceration of the pharynx for a malignant growth and operated upon it. For this reason it may be well, in case of doubt, to make a reasonable trial of antisyphilitic treatment before having recourse to the grave surgical procedure suitable to malignant disease.

IS CIRRHOSIS OF THE LIVER CURABLE?

THIS question has been discussed recently at La Société Médicale des Hôpitaux, according to the *Gazette Hebdomadaire*, Nos. 31 and 34, and answered affirmatively by several members, who quoted cases which seemed to bear out the view that the disease may be arrested or even cured. The diagnosis of cirrhosis is rarely reached until the onset of symptoms of obstructed portal circulation, although before this stage the condition may be reasonably suspected. The cases of cure are those in which the ascitic fluid has not reaccumulated after treatment, or, after a hæmatemesis, the symptoms have been relieved and the patient has had years of tolerable, or even good, health. Most physicians have met with such instances among their alcoholic patients.

In the discussion referred to, eight cases were reported by four or five members, and from the details we can reasonably infer that the ascites depended upon cirrhosis. But we must be careful not to confound the relief of a symptom with the cure of the disease. The post-mortem room affords examples of advanced cirrhosis in persons dying of intercurrent affections in whom there has never been any history of hepatic trouble, and, on the other hand, the most extensive dropsy may exist with a very moderate grade of interstitial change. We must look beyond the liver for an explanation of these facts. In the first place, unquestionably, we must take into account the collateral circulation carried on by the diaphragmatic, œsophageal, and lumbar plexuses, the hemorrhoidal anastomoses and the veins of the round ligament; if enormously enlarged, these may partially, or even fully, compensate for the narrowed portal channels, as in the rare instances of obliteration of the vena portæ. The degree to which this collateral circulation is established varies extremely in different cases, and is a very important factor in the duration of life in this disease. It will be found that the very instances in which advanced cirrhosis has been accidentally discovered post-mortem are those in which there are numerous supplementary blood-channels.

The two most striking symptoms of cirrhosis are ascites and hæmatemesis, in both of which the venous radicles of the portal vein are directly concerned. We are apt to consider them as immediate results of the heightened blood pressure, due to the narrowing and obliteration of the interlobular vessels; but Cohnheim's experiments indicate that this alone cannot induce either diapedesis or serous exudation. The condition of the vessels themselves must be taken into account, and in altered states of their walls we must seek an explanation of the sudden and profuse hæmatemesis, or the rapid dropsy. The abruptness with which one or other of these symptoms may supervene, as possibly the very first manifestation of the disease, points plainly to disturbances in the radicles of the portal veins, and not in the central hepatic branches, which, in the indurated organ, must be much less subject to variations in calibre.

Heretofore we have been in the dark as to the nature of these peripheral changes, but Dieulafoy has determined, in certain cases, the existence of a subacute peritonitis, and in four instances periphlebitis of the walls of the rootlets of the portal veins. These lesions have not been fully described, but their existence throws light on the origin of the dropsy and the hemorrhage, and they possibly furnish the additional factor which, as Cohnheim insists, is needed to permit transudation of blood corpuscles or plasma under heightened blood pressure. The dropsy may be due to transitory and remediable causes, anæmia for example, and does not necessarily indicate that the contraction of the portal canals has reached a high grade. These are points which must be considered in discussing the curability of cirrhosis, and, as we remarked, the relief of a symptom may not mean the removal of the disease.

We probably have not any remedies at our command which are capable of curing a cirrhotic liver. The nature of the tissue change is such as almost to preclude the possibility of restoration, but in the early stage many practitioners place great reliance upon drugs, particularly the salts of gold, phosphate of sodium, chloride of ammonium, and, as recommended by Dujardin-Beaumetz, hippurate of lime. Unfortunately the diagnosis in the cases in which these remedies have been reported to be successful is often a matter of doubt, and we very strongly suspect that when a case of cirrhosis presents features clearly enough marked for detection, the interstitial hepatitis is probably beyond arrest, as it is certainly past cure.

AN APPEAL FROM CHARLESTON.

As we go to press, we are in receipt of a letter informing us that the Medical College of the State of South Carolina has suffered considerable damage to its building, from the late earthquakes in Charleston, and that it will require $5000 to make the repairs necessary for the resumption of teaching. The College itself is without means, and the members of the profession in Charleston have been so severely crippled by their individual losses that they are unable to give it the requisite pecuniary aid. The Faculty are, therefore, compelled to appeal to their more fortunate brethren outside of the earthquake district, for immediate assistance, to enable them to repair the building in time for the ensuing winter course. The profession of medicine has always been noted for its generosity in times of distress, and the present appeal is sure to elicit a prompt and liberal response. THE MEDICAL NEWS will be happy to receive and forward contributions,

and acknowledge the same in its columns, and its proprietors take pleasure in starting the list with a subscription of one hundred dollars.

AT the meeting of the American Social Science Association, DR. GRACE PECKHAM, of New York, read a paper on "Nervousness of Americans." This condition, she said, was due mainly to the higher form of civilization, the excitement due to self-government and progressive ideas, and the struggle to win large fortunes, and not due to climate or to diet. It was further stated that it should be looked upon as an attribute, not a stigma.

This view of the case is of interest, and is well worthy of consideration, but it is not a complete view. Granting that the "attribute" of American nervousness exists, and granting also that it is the outcome of a worthy national striving and ambition, it by no means follows that the condition is either right or inevitable. And the effort for amelioration of such a national trait lies distinctly within the province of the medical profession.

THE LANCET this week, within its mourning-bordered cover, conveys the sad intelligence of the death of its editor DR. JAMES G. WAKLEY, which occurred on the morning of the 30th ult., from epithelioma of the tongue. This announcement is of more than passing moment, for it chronicles the demise of one who for more than a quarter of a century has guided the course of a journal which has exerted a marked and goodly influence on the profession of medicine in Great Britain.

Dr. Wakley was the youngest son of Mr. Thomas Wakley, the founder of *The Lancet*, and he proved a worthy successor to his distinguished father in its editorial control, which he assumed about the year 1859. He never engaged in medical practice, but was wholly absorbed in his editorial labors. He took an especial and active interest in boldly exposing in his columns medical abuses and public evils, and the direct impress of his character largely contributed to give to *The Lancet* the commanding position in medical literature which it has held for many years.

SOCIETY PROCEEDINGS.

THE AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE.

Annual Meeting, held at Buffalo, August, 1886.

(Specially reported for THE MEDICAL NEWS.)

(Concluded from page 276.)

DR. THEOBALD SMITH, of Washington, spoke on

THE VARIABILITY OF PATHOGENIC ORGANISMS, AS ILLUSTRATED BY THE BACTERIUM OF SWINE PLAGUE.

By inoculation into mice, a bacterium was inoculated from one of a number of spleens taken from swine plague in Nebraska, which resembles the bacterium of swine plague found in the east, in regard to its morphological and pathogenic characters, and yet differs from it in certain minor histological features, so that it seems justifiable to regard one as a variety of the other, or both varieties of a third form.

This new bacterium resembles the bacterium of swine plague in form, size, and mode of staining. Like the former, it is motile when cultivated in liquid media and fails to liquefy gelatine. Both grow alike on agar-agar and potato, and both fail to affect the microscopic appearance of milk in which they multiply. The thermal death point of both is about 58° Centigrade. Cultures of various ages are killed by an exposure to this temperature for fifteen or twenty minutes. In neither is there any indication of spore formation. Both produce the same lesions in mice, rabbits, and pigeons after the subcutaneous injection of pure cultures.

This bacterium differs from the bacterium of swine plague in the following minor but constant features: 1. In liquid cultures of the former the surface was covered by a complete membrane within one or two days, which is invariably absent in cultures of the latter, but may occasionally appear in advanced old cultures. 2. It is more sensitive to the reaction of the culture media, as it failed to grow in neutral gelatine but grew vigorously in the alkaline medium. 3. This microbe failed to induce the disease in guinea-pigs.

The study of these two related microbes presents the first evidence as to the possibility of the variation of pathogenic forms. It raises a number of questions as to the causes of variation, whether dependent on external conditions, such as climate, soil, etc., or upon the organization of the susceptible animals, which, in turn, depends upon their food, mode of life, race, etc.

These facts suggest the possibility of the variation of other pathogenic microbes and may offer an explanation of the varying virulence of epidemics of the same disease at different time and in different localities.

Very recently a third form was obtained from swine plague in Illinois, which resembles the two forms compared in its microscopic characters, its motility in liquids, its failure to liquefy gelatine, and in its powerfully narcotic effect on muscular tissue at the place of inoculation. It is fatal to mice, rabbits, and pigeons only when a larger quantity of virus is injected than is needed in case of the two other forms. Of the three forms, it seems to be least adapted to a true parasitic existence.

DR. D. E. SALMON, of Washington, made some remarks on

THE THEORY OF IMMUNITY FROM CONTAGIOUS DISEASES.

He discussed the antidote theory, the exhaustion theory, and the vital resistance theory, and cited experiments to show the latter to be the true one. The tissues of the body when normally active are not suited to the growth of microbes; the former are overcome by a poison produced by the latter. Immunity is a tolerance of the tissues for this poison and can be produced by injecting into the tissues the poison which contains no living germs.

Dr. Sternberg claims priority for having originated the vital resistance theory of immunity. Dr. Law

claims to have reached the same conclusion independently and at the same time, and to have demonstrated that immunity might be produced with sterilized virus.

Dr. Salmon showed that the theory under consideration was offered several years before the time claimed by either of these gentlemen; also that Law's demonstration was unsatisfactory, that his experiments repeated by the writer do not sustain his claims, and that it is not probable that immunity can be granted under the conditions of this experiment.

DR. SALMON then offered some remarks on the

IMMUNITY FROM CONTAGIOUS DISEASES PRODUCED BY PRODUCTS OF BACTERIAL MULTIPLICATION.

When children have recovered from the measles they conclude that one of the troubles of life have been overcome, and no matter how much they are exposed to that disease in the future, they rely upon their power to resist it without inconvenience. As a rule, their expectations are correct. The first attack has granted them an immunity from the effects of the contagion, which, while it is not absolute in every case, is certainly very remarkable. It is also a matter of the most common observation that other contagious fevers to which people are subject grant a similar immunity—a power to resist those particular forms of contagion for the remainder of the individual's life. The same is true of certain contagious fevers of other species of animals.

The nature of such acquired immunity has long been an interesting subject for speculation, and until comparatively recent times it has been mysterious and incomprehensible. Since the demonstration of the germ theory of disease it has become evident that there were three possible explanations.

1. Something had been deposited in the body during the attack of disease that was unfavorable to the specific germ.

2. Something had been exhausted which was essential to the development of this germ.

3. The living tissues had acquired such a tolerance for the germ, or for a poison which it produces, that they are no longer affected by it.

If either the first or the third of these explanations were correct, it would appear possible that immunity might be granted by introducing into the tissues the liquid in which the specific germs had been cultivated, and from which they had been removed by filtration, or in which they had been killed by suitable methods. He has long been convinced of the correctness of this supposition, but it is only recently that he has been able to make a satisfactory demonstration of the principle.

In these experiments he has used the virus of the contagious fever of hogs, known as swine plague. This virus, cultivated in the laboratory in suitable liquids, is very destructive to pigeons when injected hypodermatically in the region of the pectoral muscles, in doses of three-quarters of a cubic centimetre. To test the protective effects of the products of bacterial growth, the virus referred to was cultivated in a one per cent. solution of peptone. After a number of days' cultivation, the culture was raised to 58° to 60° C.—a temperature which soon kills the microbe; but to make sure that all life was destroyed, he invariably transferred a few drops of the heated liquid to a fresh tube of culture fluid. If any multiplication of the germs occurred, it was of course evident that the temperature had not been high enough, or was not maintained for a sufficient time. This made it necessary to repeat the operation. As the thermal death point of the microbe had been carefully determined, and as care was used to raise the temperature somewhat beyond this point, it was seldom that any of the organisms remained alive. No liquid was used in these experiments, however, which had not been tested in this way and found free from living organisms. The necessary details will be found embodied in the table below.

Of the nine experiments included in the table, five, viz., the first, second, fifth, seventh, and eighth, give very positive results. In these 27 pigeons were used.

TABLE SHOWING RESULTS OF EXPERIMENTS.

Pigeons. No.	Sterilized virus. 1st dose. c. c.	2d dose. c. c.	3d dose. c. c.	4th dose c. c	Tot'l.	Living virus. c c.	Results of inoculation.
1st Exper.							
1	0.4	1.5	1.5	1.5	4.9	0.75	No effect.
2	1.5	1.5	1.5	...	4.5	0.75	" "
3	1.5	1.5	1.5	...	4.5	0.75	" "
4	1.5	1.5	0.	...	3.	0.75	" "
5	0.8	0.	...	...	0.8	0.75	Death in 48 hours.
6	0.	0.	...	...	0.	0.75	" 24 "
2d Exper.							
7	1.	1.	0.75	...	2.75	0.75	No effect.
8	1.	1.	1.	...	3.	0.75	" "
9	1.	1.	1.	...	3.	0.75	" "
10	1.	1.	...	...	2.	0.75	" "
11	1.	1.	...	...	2.	0.75	" "
12	1.	1.	...	...	2.	0.75	" "
13	0.	0.	...	...	0.	0.75	D'th within 24 hrs.
14	0.	0.	...	...	0.	0.75	" " "
15	0.	0.	...	...	0.	0.75	No effect.
3d Exper.							
16	1.	...	...	...	1.	1.	Death in 6 days.
17	1.	...	...	...	1.	1.	" 16 "
18	1.	...	...	...	1.	1.	No effect.
19	0.	...	...	...	0.	0.	" "
4th Exper.[1]							
20	1.	1.	...	...	2.	0.75	All slightly sick, but recovered.
21	1.	1.	...	...	2.	0.75	
22	1.	1.	...	...	2.	0.75	
23	0.	0.	...	...	0.	0.75	
5th Exper.							
24	1.	1.	...	...	2.	0.75	No effect.
25	1.	1.	...	...	2.	0.75	Slightly ill; recov.
26	1.	1.	...	...	2.	0.75	No effect.
27	0.	0.	...	...	0.	0.75	Death in 5 days.
6th Exper.							
28	1.	1.	...	...	2.	0.75	" 7 "
29	1.	1.	...	...	2.	0.75	" 11 "
30	1.	1.	...	...	2.	0.75	No effect.
31	0.	0.	...	...	0.	0.75	" "
7th Exper.							
32	1.	1.	...	...	2.	0.75	" "
33	1.	1.	...	...	2.	0.75	" "
34	0.75	1.	...	...	1.75	0.75	" "
35	0.	0.	...	...	0.	9.75	" "
8th Exper.							
36[1]	1.	1.	...	...	2.	0.75	" "
37[1]	1.	1.	...	...	2.	0.75	" "
38	1.	1.	...	...	2.	0.75	" "
39	0.	0.	...	...	0.	0.75	Death in 2 days.
9th Exper.							
40[1]	1.5	1.5	...	...	3.	0.75	" 3 "
41[1]	1.5	1.5	...	...	3.	0.75	No effect.
42	1.	1.	...	...	2.	0.75	" "
43	1.	1.	...	...	2.	0.75	" "
44	0.	0.	...	...	0.	0.75	Death in 1 day.
45	0.	0.	...	...	0.	0.75	Sick; recovered.

[1] Evap. virus.

RÉSUMÉ OF EXPERIMENTS.

	No. inoculated.	Died.		Recovered.		Not affected.	
		No.	per ct.	No.	per ct.	No.	per ct.
Protected with more than 1 c.c. sterilized virus . . .	29	3	10.3	4	13.8	22	75.9
Unprotected . . .	15	10	66.7	2	13.3	3	20.0

Of the 19 protected pigeons not one died from inoculation, and 18 had acquired perfect immunity; while of the 8 unprotected pigeons, which were used as checks, 7 died and but 1 resisted. The ninth experiment is almost equally positive. In this case, the virus used for the birds was evaporated over a water-bath to learn if a boiling temperature destroys the protective power. One of the pigeons so treated did not gain immunity.

The negative results of the other experiments were partly due to changing the conditions in order to learn those which were favorable and unfavorable to the production of the desired effect.

DR. JOSEPH JASTROW, of Baltimore, read a paper on

THE DREAMS OF THE BLIND AND THE CENTRES OF LIGHT.

The object of the paper was to determine the extreme age at which a child may become blind and yet lose all memory of the visible world, so that it no longer sees in dreams.

Almost all dreams of normal persons are sight-dreams, and a dream is often spoken of as a vision. The blind are deprived of this most important sense; but if they have not been born blind, they may remember enough of what they have seen to enable them to imagine how things look, and, when the imagination has free play in sleep, to picture themselves as in full possession of all their senses. Physiologists would explain this by saying that during the years in which they saw, a certain part of the brain has become educated to receive and interpret all these messages which the eye sends, and that, when this part of the brain acts spontaneously in sleep, the person dreams of seeing. Such a portion of the brain would be called the sight-centre.

If, now, we find out the latest age at which blindness may set in, and yet the person keeps on dreaming of seeing, we will find out the time it takes for this sight-centre to develop; for, of course, it is not present in the newborn infant. For this purpose about two hundred blind persons of both sexes were questioned at the institutions for the blind in Philadelphia and Baltimore, and it was found that those who became blind before their fifth year never dreamed of seeing; of those whose sight was lost between the fifth and the seventh year, some did and some did not see in their dreams; while all whose eyesight was destroyed after the seventh year had quite as vivid dream-visions as seeing people. The fifth to the seventh year is thus shown to be the critical period. This period corresponds with the age which authorities assign as the limit at which a child becoming deaf will also become dumb; and also with the age of one's earliest continuous memory of one's self.

It is interesting to note that blind persons dream quite as frequently as people with normal sight, and that with those who do not see in their dreams, hearing plays the principal part. When dreaming of home, for instance, they will hear their father's voice or their sister's singing, and perhaps will feel the familiar objects in the room and thus know they are at home. We, in such a case, would see it all.

CORRESPONDENCE.

THE HYPODERMATIC ADMINISTRATION OF MORPHIA FOR AUTUMNAL CATARRH.

IN the *American Journal of the Medical Sciences* for Jan. 1873, I called attention to the hypodermatic administration of morphia for autumnal catarrh. Experience has confirmed the efficacy of this treatment in relieving the paroxysms of this disease, and in moderating the severity of its annually recurring attacks. I venture to report a typical case, though unfinished, because the season is still at its height, and the treatment is available to those practitioners who have not the opportunity to use local means for the radical cure of this distressing ailment.

September 2, 1886. Mrs. A., æt. thirty; disease dates back many years; attack began August 10th, several days earlier than usual; went to the seashore for a fortnight, during which time the severity of the symptoms diminished; returned on the 30th, with immediate bad results.

Present condition: Violent sneezing, eyes and nose itching, swollen, and streaming; incessant wheezing cough during the day; at night, severe asthma, necessitating the upright position, and entirely preventing sleep. One-fourth grain of morphia sulph., hypodermatically gave instant and entire relief, which lasted nearly forty-eight hours. This was repeated on the 4th, 6th, 8th, 10th and 11th, with like result (on the last date, sooner, on account of the conjunctival irritation). I shall probably be able during the remainder of the period to keep the attack under control, with half-weekly injections. I have not in this, and other cases, obtained relief by the local application of a six per cent. solution of cocaine hydrochlorate.

WM. MOSS.

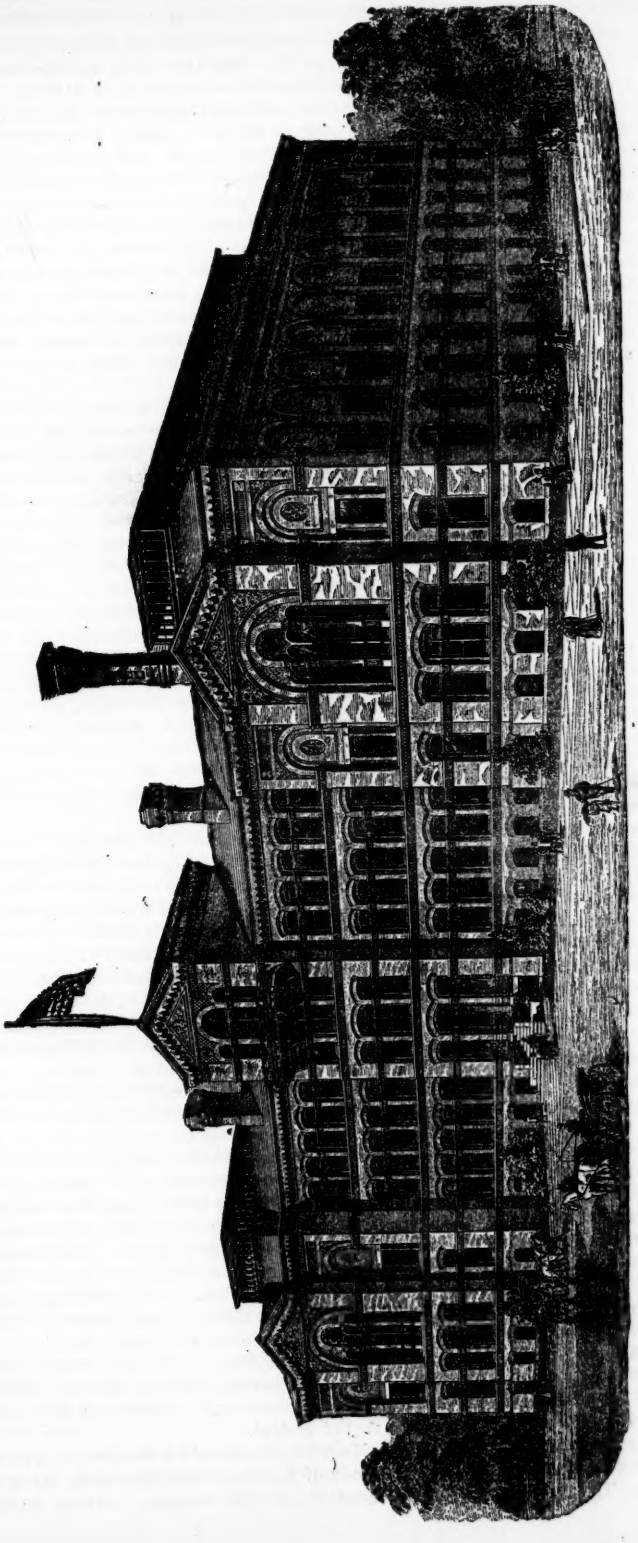
CHESTNUT HILL, PHILADELPHIA, September 12, 1886.

NEWS ITEMS.

WASHINGTON.

(From our Special Correspondent.)

THE BUILDING FOR THE ARMY MEDICAL MUSEUM AND LIBRARY is being erected on the southeast corner of the grounds occupied by the Smithsonian Institution, and will, when completed, be in close proximity to the National Museum and the Smithsonian Institution. This site is readily accessible by the street cars, but is a little out of the way of ordinary travel either for business or pleasure. The reservation comprehends 270 x 160 feet, facing B Street which is south, and abutting on 7th Street. The plans for the building were prepared by Cluss, the architect, under instructions from Dr. Billings, acting for the Surgeon-General. According to the plans, the building is to cover a space of 232 x 136 feet. The appropriation granted by Congress for building purposes was $200,000, being $50,000 less than was asked for, and required a modification of the plans and a plain severity of style of finish, devoid of ornamentation.



MEDICAL LIBRARY AND MUSEUM, U.S.ARMY
Washington, D.C.

The accompanying cut gives an idea of the exterior of the building as it will appear when completely finished with pressed brick and terra cotta, the roof being constructed of rolled iron beams and trusses.

As to the general arrangement and construction of the building, the complex consists of a centre building 112 feet in length, 55 feet in width, and four stories high above the basement. It is arranged for the administration clerks and photographer. This structure is flanked by two wings of 60 x 131 feet. They contain a basement, a first story allotted to offices, and a second story, open to the roof and surrounded by galleries. This second story accommodates the museum in the east wing and the library in the west wing. Both wings have continuous ventilating lantern skylights. A smaller wing in the courtyard, will hold the steam-boilers, steam-pumps, and coal cellar. The basement is eleven feet in height; the first story fifteen, the second story fourteen, and the third and fourth stories thirteen and twelve feet high respectively. The museum and library are thirty-one feet high to the eaves and forty-seven feet to the ridge of the lanterns. The placing of such an enormous quantity of books in the library will produce a very heavy weight which will require unusually strong supports on the floors below; the first floor just below the library being intended to be used for pension records.

The foundations consist throughout of concrete, the walls are built of brick, constructed with a bonded internal lining of hollow bricks for all walls exposed to the weather. The moulded work and the cornices consist of pressed brick and terra cotta. The floors of the first story are constructed of brick arches between rolled iron beams, the floors above are formed of flat arches, built of hollow bricks between rolled beams. The roofs of the centre building are constructed similarly to the floors, but of lighter material. The columns used are of fire-proof sectional wrought iron. The library and the museum are constructed so as to form fire-proof compartments separated from the other parts of the building. The stairs are of wrought and cast-iron.

The contract calls for the completion of the building by February 1, 1887, but unanticipated difficulties which have arisen in securing suitable brick during the present season, will cause a delay of some weeks. The basement and first story walls of the building are up, and the first tier of iron beams laid. The appropriation asked for, sixty thousand dollars, is mainly for the iron frames and shelving of the book stacks, and similar furnishing for the pension records, exhibition cases of museum, etc., and, a very important item, for the construction of an addition, for the disposition of all material such as is used in laboratory work, as may by its fumes or gases tend to injure the contents of the main building; and for the laboratory and work-rooms.

The library wing (west) is provided with thirty-four stacks, solely for the accommodation of the books and library material; where the wing is joined to the centre building, and where consequently the light is less in amount, tables will be placed for the accommodation of large atlases of plates, portfolios of engravings, etc.; readers and casual visitors being provided for by suitable reading-rooms close at hand, where books can be brought to them as desired. These stacks have each three stories, and each story, which is seven feet nine inches high, has four divisions, the lower two giving shelf room of twelve inches in depth for the more ponderous tomes, the upper two of eight inches depth, well lighted by windows, making thirty-four shelves to each story of a single stack; and an estimated total capacity of 170,000 books. The classification of these books and their proper positions upon the shelves for readiness of access, are the problem which is now being considered. When we refer, a little further on, to the museum wing and its arrangement, it will be seen that a classification has been prepared there which seems to meet the requirements fairly and satisfactorily; and a similar classification will be attempted with the library, modified, of course, by the different nature of the material to be utilized.

The museum wing is lighted for the first story by its side windows, but for the second story, formed by a gallery, has to depend upon the skylight, consequently the exhibition cases will be varied in their arrangement for each story, the gallery having side or wall cases as well as those placed transversely, and along the central border of the gallery platform it is proposed to place those beautiful dissections made under spirits, after Turner of Edinburgh, which are placed in porcelain bowls with cemented glass covers, familiar to those who have visited the English museums—of which Dr. Billings has obtained fine specimens from Dr. Cunningham, of Dublin, and which have been most admirably followed by Mr. J. S. Wortman, the anatomist of the museum. Dr. Billings proposes to have about 150 of these so placed. When one sees these specimens for the first time, he is very apt to become enthusiastic over them, but they are probably well known to many of the readers of THE NEWS.

The microscopical material, although belonging to the museum, must, of course, be handled in a way peculiar to itself, and has its own room off from the museum in the central building, where probably the curiosity-seeker will not find much to attract him, but the student will have suitable instruments and ample opportunities to take full advantage of the collection. Near the microscope room, is a room still in the centre building—third floor—which will be fitted up with apparatus corresponding to Galton's views upon the subject, as an anthropometric room. This is likely to prove a very interesting feature of the new building. At first its use will probably be limited, as its records would be confined to a few occasional and well-known visitors, but, as its usefulness and importance become better known and more widespread among the throng of visitors to the National Capital, there may be an imperative demand for an extension of its scope, and its records become voluminous and correspondingly valuable. To complete the usefulness of the museum itself, upon the first floor, adjoining the rooms set aside for the pathologist and anatomist, is a large and suitable room fitted up with drawers and cabinets to contain the study collection, that is, specimens of osteology which are disarticulated and prepared in the rough to show certain characteristics, and other specimens and preparations that can be handled by the student.

In going further and attempting to give an idea of the mode of handling and classifying the material to be displayed in this museum, I cannot do better than to

refer to the remarks made by Dr. Billings at a recent meeting of the Philosophical Society in this city.

The subject under consideration was the management of museums, and the whole discussion was well worthy of being reported in full. Material illustrating the subject was exhibited, and the argument was sustained by Dr. Billings on the part of the Army Medical Museum, Prof. G. Brown Goode and Mr. Lucas on the part of the National Museum, and by Mr. Merrill giving his ideas of a Geological Museum. Dr. Billings stated the special scope and purposes of the Army Medical Museum to be:

1. To illustrate the effects, immediate and remote, of wounds, and of those diseases prevalent in the army—that is, the diseases and injuries of adult males.

2. To illustrate the work of the medical department of an army, modes of transporting the sick and wounded, hospitals, medical supplies, instruments, etc.

3. To illustrate human anatomy and pathology of both sexes and of all ages. This requires many specimens in comparative anatomy and pathology, which are indispensable for the correct understanding of the structure, development, abnormities, and diseases of man. This would not form a museum of comparative anatomy, which belongs to the functions of the National Museum.

4. To illustrate the morphological basis, or want of such basis, for ethnological classification, more especially of the native races of America, including anthropometry and craniology.

5. To illustrate for medical investigators and teachers the latest methods, the newest apparatus, etc., for biological investigations, and various modes of preparing and mounting specimens. In connection with this it is hoped to induce original workers to deposit in the museum type specimens, or series of specimens illustrating their discoveries and methods.

With this outline before us it is easy to see the importance of a clear and well-defined classification to work upon before the first specimen is placed in position. It was well said at the meeting referred to, that a museum should be a museum of labels as well as of specimens; how forcible the application must be to the classification. Accordingly, the classification is given in the following general plan:

A. General and regional anatomy, physiology, and pathology:

a, Head and neck; *b*, thorax; *c*, abdomen; *d*, pelvis (for female pelvis see M.); *e*, upper extremity; *f*, lower extremity.

B. Skeleton (bones, ligaments, and joints):

a, Skull; *b*, vertebræ, ribs, sternum, and hyoid; *c*, pelvis; *d*, upper extremity; *e*, lower extremity.

C. Muscular system (muscles, tendons, and fasciæ):

a, Head and neck; *b*, trunk; *c*, upper extremity; *d*, lower extremity.

D. Circulatory system:

a, Heart and pericardium; *b*, arteries; *c*, veins; *d*, capillaries.

E. Lymphatic system and ductless glands:

a, Lymphatics; *b*, spleen; *c*, supra-renal capsules; *d*, thyroid gland; *e*, thymus gland.

F. Nervous system:

a, Encephalon (exclusive of medulla); *b*, medulla oblongata and spinal cord; *c*, peripheral and sympathetic nerves.

G. Respiratory system:

a, Larynx and trachea; *b*, lungs and pleura.

H. Digestive system:

a, Teeth; *b*, mouth; *c*, pharynx and œsophagus; *d*, stomach and duodenum; *e*, intestines (exclusive of anus and rectum); *f*, anus and rectum; *g*, salivary glands; *h*, pancreas; *i*, liver; *k*, peritoneum.

I. Organs of sense:

a, Eye and appendages; *b*, nose; *c*, tongue; *d*, ear.

K. Urinary organs:

a, Kidneys and ureters; *b*, bladder and urethra.

L. Male generative system:

a, Scrotum, testes, and vasa deferentia; *b*, vesiculæ seminales, prostate, and Cowper's glands; *c*, penis.

M. Female generative system and pelvis:

a, Pelvis; *b*, ovaries; *c*, uterus, ligaments, and Fallopian tubes; *d*, vagina and vulva.

N. Tegumentary system.

O. Microscope.

P. Weapons, missiles, and foreign bodies.

Q. Transportation and care of sick.

R. Anthropology.

S. Materia medica and chirurgica.

T. Miscellaneous.

The above comprise the main heads of the division into subjects; to make this available there follow the numbered subdivisions coming under the lettered headings:

1. Embryology and development.
2. Anatomy and physiology.
3. Abnormities and deformities.
4. Diseases.
5. Injuries and foreign bodies.
6. Repair and restoration.
7. Surgery.

To make the subdivisions clearer, they, too, must in some cases undergo further division. Take for example:

4. *Diseases*; under this head will be found
41. Disorders of the circulation.
42. Hypertrophy and dilatation.
43. Atrophy, degeneration, and mortification.
44. Inflammation and its sequelæ.
45. Parasites, parasitic and infectious diseases.
46. Tumors and concretions.
47. General diseases.
48. Diseases peculiar to the system or organ.
49. Other diseases.

One or two illustrations will suffice, I think, to show clearly the practical working of this system. For instance, here is specimen No. 1052. A wet preparation of the heart with the left ventricle perforated by gunshot near the apex. It is marked D. *a*, 5., or D. Circulatory system; *a*, heart; 5. Injuries and foreign bodies.

Another is specimen 5700. A wet preparation of the cancerous integument of a hand. This is marked A. *e*, 46., or A. General and regional anatomy; *e*, upper extremity; 46. Tumors and concretions. It has also a cross reference, N. 46., or N. Tegumentary system; 46. Tumors and concretions.

It is not proposed to place specimens illustrating normal anatomy in one place, and pathological specimens in another, but to place together as far as possible all the specimens illustrating the morphology, development,

and pathology of a particular organ or system, including both wet and dry preparations, models, casts, etc.

It remains for time to show how far this system will answer its purpose.

A WISE PRECAUTION.—Before undertaking an autopsy, Dr. Clevenger recommends holding the hands over strong liquid ammonia, when the smarting which ensues will reveal all sensitive or abraded places that need a touch of caustic or other protection before beginning the examination.

NEW METRIC ABBREVIATIONS.—The International Committee of Metric Weights and Measures has adopted the following system of abbreviations. Italics are employed, with the exponents 2 and 3 to denote square and cubic measure: Metre = *m*, decimetre = *dm*, centimetre = *cm*, millimetre = *mm*, kilometre = *km*. Metre square = m^2, metre cube = m^3, and so for the rest. Litre = *l*, decilitre = *dl*, etc. Kilogram = *kg*, dekagram = *dkg*, gram = *g*, decigram = *dg*, centigram = *cg*, and milligram = *mg*.

A NEW INFIRMARY.—The corner-stone of a new infirmary for the Five Points House of Industry, in New York, was recently laid with appropriate exercises. The building, which will be ready for occupancy in October, is to be four stories high, and will have a frontage of twenty-five feet and a depth of eighty feet; with accommodations for about eighty patients. The erection of this infirmary was rendered necessary by an act of the Legislature, passed at the last session, requiring children suffering from infectious eye disease to be isolated.

LUNACY COMMISSION.—At the meeting of the Philadelphia County Medical Society on September 8, Drs. Mills, French, and Henry, were appointed a committee to visit all asylums for the insane in the county of Philadelphia, in accordance with the request of the State Commission in Lunacy.

THE PASTEUR INSTITUTE has received a donation of 100,000 francs from the Russian Government.

THE SECOND CONGRESS OF RUSSIAN PHYSICIANS will be held in December of this year, in Moscow. The president of the association is Professor Sklifassovski.

CONDEMNATION OF A MIDWIFE.—In Altenburg, recently, a midwife was sentenced to imprisonment for two years, because she advised the parents of an infant suffering from ophthalmia not to seek medical advice. The only treatment consisted in local applications of chamomile tea, and the child lost one eye in consequence.

A TWO-POUND CHILD.—Dr. S. L. Post reports in *Daniel's Texas Medical Journal* that he delivered a woman, twenty-three years of age, and the mother of three children, of a fœtus weighing only two pounds. There were no pulsations in the cord, which was cold and atrophied, and wholly detached from the placenta. After diligent work the child was made to breathe, and it is now as well as any infant. The woman menstruated regularly during her entire period of gestation, and during the last four weeks flooded so profusely that she was unable to attend to her domestic affairs.

HOMO CAUDATUS.—Dr. Elisseyeff reported the following case at the meeting of Russian physicians held in St. Petersburg in April (*Vratch*, No. 16, 1886). A woman, twenty-three years of age, consulted him on account of a projection in the coccygeal region, which had become very painful from the irritation of a bandage which she had used to prevent its growth. The tail was nearly two inches long and over half an inch broad, and was composed of two vertebral segments covered by fat and hairy integument.

MEDICAL INSPECTION IN BROOKLYN.—The Brooklyn Commissioner of Health, Dr. Andrew Otterson, has inaugurated in that city an admirable system of medical inspection and relief in the tenement-house districts, with special reference to the diseases of infants during the heated season. Ten physicians have been appointed, each assigned to a special locality, who are instructed to search for sick children needing attention, and to care for them, furnishing medicine gratuitously where parents are unable to pay for it, and at a reduced price to those who can. They are to note the condition of premises, and report where sanitary improvements are needed, give advice as to healthful manner of living, urge parents to take their children into the fresh air as much as possible, and give orders on the diet dispensaries for proper food when it cannot be obtained otherwise. The salaries of the physicians ($75 a month) are to be paid out of the emergency fund. As a contrast to this beneficent movement in Brooklyn, the New York Board of Appointment this year refused to allow the appropriation devoted last year to similar uses, with the result of a marked increase of infant mortality in the crowded districts of that city.

REPEATED VACCINATIONS IN THE INCUBATION STAGE OF SMALLPOX.—A Russian medical student, M. GUBERT, recently performed a series of experiments with calf vaccine, chiefly making use of dogs as subjects, for the purpose of deciding whether there is any use in vaccinating persons (1) who have already been infected by smallpox, (2) who are in the incubation stage, or (3) in whom the disease may have actually begun to manifest itself. This question, he says, has generally been decided in the negative, on the ground that insusceptibility to smallpox is only obtained thirteen or fourteen days after vaccination—that is, after a period at least equal to that of the incubation stage. Having somewhat modified the method of vaccinating, M. Gubert, who describes his experiments in the *Zemskaya Meditsina*, was able to obtain vaccine vesicles in a shorter time than usual. By repeating the vaccination on three successive days he was able to produce mature vesicles in four or five days. This rapid saturation of the organism with the vaccine virus enabled M. Gubert to arrest the development of the disease in twenty-seven persons, in whom, he states, he was quite certain that the smallpox was incubating, while in twelve others the disease was so modified as to be considered only varioloid. The vaccination was performed in some cases when the temperature had already reached 40° C. It should be remarked that all the experiments were

carried out with calf lymph, so that we are as yet without information as to whether humanized vaccine could be made to "saturate the organism" sufficiently to produce mature vesicles in four or five days. At all events, M. Gubert's observations are interesting, and worthy of repetition by other practitioners.

MEDICAL EDUCATION IN CHINA.—The attempts which have hitherto been made to promote medical education in China have failed, in consequence of the inability of natives to acquire a sufficient mastery of English; these difficulties, however, it is hoped, have at last been surmounted, due largely to the persistent energy of Dr. Myers. About two years and a half ago, through the kindness of some officials in Hong Kong, the matter was laid before the boys at the Central School, and two of the senior scholars, named Chan Chun-kai and Li Tsun-fan, volunteered to go to Formosa, and enter upon the course of study prescribed. The following is the scheme: the subjects for study—anatomy, physiology, elementary surgery, and inorganic chemistry—forming the topics of the first professional examination. No candidate is allowed to present himself unless he produces a certificate from a legally qualified medical man of having studied these subjects for the full period of two years, the examination to be held at either Hong Kong or Shanghai, before a board of the most eminent men within reach. After having passed this, the candidate returns to the hospital, and studies for a further term of two years the following subjects: practice of medicine, midwifery, clinical medicine, and clinical surgery, including operative surgery, use of instruments, medical and surgical, and bandaging, with materia medica and pharmacy. Having obtained a certificate to this effect, and also one of his identity with the candidate who passed the first examination, he would be entitled to present himself before a similar board in either Hong Kong or Shanghai, accordingly as either port had been selected for the first professional. Should he be found proficient, he will then be entitled to receive a certificate of competency or diploma from the hospital setting forth these facts in English, Latin, and Chinese. In accordance with this scheme, Dr. Myers recently brought down the two students, who underwent the examination with the following results: Li Tsun-fan obtained 72.6 per cent., and Chan Chun-kai 70.5 per cent. of possible marks. The presentation by his Excellency, the acting governor, of certificates granted to the two successful candidates for the first professional examination for the license from the David Manson Memorial Hospital, took place on May 28th at the Central School.

AMERICAN CANNED GOODS are being imported into France so rapidly and in such quantities as to alarm the producers of that country. As a result of this, we shall probably see a revivification of all the instances reported in the daily papers in past years of poisoning from these articles, some of which may have been due to the negligence of those engaged in the canning process, but most of which were undoubtedly due to carelessness or want of thought in the consumer. That the contents of some of the millions of cans annually put up for market in the United States should spoil is not to be wondered at, inasmuch as every housewife has the same experience in her domestic preserving. But in most of the instances where sickness has occurred from the consumption of such goods, the color or the taste gave ample warning.

SIR SPENCER WELLS has been elected, by the Section of Scientific Medicine, a Member of the Royal Leopold-Caroline German Academy of Naturalists in Halle.

DISINFECTION OF BILGE-WATER.—Following the results of experimental work conducted in the *Deutsche Reichsgesundheitsamt*, the German navy is instructed to disinfect the holds of vessels and contents with corrosive sublimate. The results of the investigations referred to are:

1. Sublimate destroys the most resistant microörganisms, and it is safe to assume that the special infectious agents that may have become established in a ship-hold can be so destroyed.

2. The sublimate should be evenly distributed. To this end so much should be added to the bilge-water that a distinct mercury reaction can be shown.

3. Complete disinfection is accomplished after eighteen hours.

4. The hold should be washed and pumped dry four successive times. Thereafter only traces of sublimate remain, that can be of no danger to the crew.

5. The ship is not injured by these sublimate disinfections.

DEATH OF ANOTHER PATIENT OF M. PASTEUR.—A child, three years and a half old, is reported, in the *Semaine Médicale*, to have died lately from rabies at Teste. He was bitten by a mad dog on June 14th last. On the 16th, he was brought to Paris, where, during ten days, he was submitted to Pasteur's treatment. After his return to Teste on June 28th, the child was seized on August 12 with the first symptoms of hydrophobia, to which he succumbed in a few days.

LAY DIAGNOSTICIANS.—A druggist in a town of 3000 inhabitants in the northern part of Iowa requires all applicants for liquor to state for what special "necessity for medicine" the liquors are to be used, and their statements are written on the application which they sign, Glancing over this druggist's report for the last month beer is found to have been purchased as a remedy for the following "diseases:" Loss of appetite, general debility, overheating, sour stomach, indigestion, biliousness, headache, rheumatism, sick headache, ague, consumption, dyspepsia.

A majority of the patients were troubled with "loss of appetite," "general debility," or "dyspepsia." For the first-named complaint thirty-three quarts of beer were required, while general debility demanded thirty-four quarts, and the dyspeptics forty-nine quarts. Sixty-nine quarts are reported as having been purchased for "family use." Whiskey also appears to be a remedy for the same line of disorders, as the following list shows: Overheating, ague, loss of appetite, colds, pain in stomach, colic, rheumatism, headache, dyspepsia, sideache, general debility.

Wine and brandy were both needed in cases of overheating, while alcohol was purchased by one man to cure corns. These facts are gleaned from the report of

one druggist only, and, as the law does not require that a record of this kind be kept, probably but few druggists in the State take the trouble to inquire for what disorders the liquors purchased of them are used. The Iowa Board of Pharmacy Commissioners lately issued a cautionary notice to pharmacists in regard to the sale of beer by them, and recent prosecutions of pharmacists who have failed to obey the spirit of the law will probably have a tendency to make them more cautious in the future.

LEASING OF AN UNSANITARY HOUSE.—A very interesting case recently came up in an English court. An owner let to a tenant a house in an unsanitary condition. Shortly after the tenant had taken the house, several members of his family were seized with an illness due, it was alleged, to the escape of sewer gas, and the illness proved fatal to his wife. He claimed damages for the expenses he had incurred in medical attendance and removal, and also for the loss of his wife, at whose death an income of £800 per annum ceased, and the trial ended in favor of the plaintiff, with a verdict for £2240.

An appeal was had and the verdict set aside, and the case now goes to the Court of Appeals. The *Sanitary World*, a high English authority, in discussing the case says: "A person about to take a house is not in a position to know much, if anything, as to the state of the drains. On the other hand, the landlord does, or should, and we take it that it is his duty to see that it is properly trapped and in good order, and should certainly ascertain this before letting his house, and if he fails in this respect we certainly think he ought to be held responsible for any ill effects his tenants may suffer through his negligence."

If, however, the Court of Appeals decides for the defendant, then, the same writer continues, it will "behoove every one who is about taking a house to have it properly surveyed before committing himself by signing an agreement even for a yearly tenancy, or to have a clause inserted in the deed that the drainage of the premises is in perfect order, which possibly would be the better way, as defects in drains are not found out at once. It is possible that the landlord will object to putting in a clause of this kind. We know that it is an unusual one, but that is no reason why it should not be made a usual one, which it would be as well to adopt at once, for even if the plaintiff does appeal, we should have to wait a very long time for the decision, and, in the meantime, houses will have to be taken; therefore, to make sure, and save after-expense, we should advise our readers to follow the course we suggest. If the drainage is all right, surely no owner would object to say so, and have it put in black and white; if he objects to this very reasonable request, his house would be better to remain empty."

A DEFINITION OF GOUT.—Dr. Milner Fothergill gives the following succinct account of the pathology of gout: "When kidneys first appear in the animal kingdom, the form of urinary secretion is uric acid. Uric acid belongs to animals with a three-chambered heart and a solid urine (reptiles and birds). The mammalia possess a four-chambered heart and fluid urine, the form of urinary secretion being the soluble urea. When the human liver becomes depraved or degraded, it has a tendency to form primitive urinary products. To the question, "What is gout?" the answer is: "Gout is hepatic reversion, when primitive urine is formed by a mammalian liver."

NOTES AND QUERIES.

CORRIGENDUM.

IN our abstract of Prof. Wilder's paper on "Cerebral Fissures," September 4th, p. 275, the omission of the word *never* between *has been* and *wholly interrupted*, reversed the author's statement.

MACROSCOPIC OR MEGASCOPIC.

To the Editor of THE MEDICAL NEWS,

SIR: In your report of the recent meeting of the American Neurological Association (August 7th, p. 165, top of second column), I am credited with having "found alcohol to answer all the requirements for the purpose of microscopical examinations" of the human brain. I am sure that I was very careful to say *macroscopical*, because, as stated by me, in *The Medical Record*, February 23, 1884, p. 207, histologists differ respecting the neuro-histological efficacy of alcohol, and I am not prepared to affirm its sufficiency, although I anticipate much when it is properly combined with a low temperature. Since the error is very likely to occur, excepting where, as on p. 142 of THE NEWS, the employment of both *microscopic* and *macroscopic* in the same paragraph protects the latter from the interference of some printer or proof-reader whose "little knowledge" is, in this case, really "dangerous," permit me to suggest that *macroscopic*, as a technical synonym of *gross*, *naked-eye*, etc., be replaced by *megascopic*, which is given by the later dictionaries, has been used by Spitzka, and some other anatomists, and cannot be mistaken for any other word.

BURT G. WILDER, M.D.

ITHACA, N. Y., September 4, 1886.

OFFICIAL LIST OF CHANGES IN THE STATIONS AND DUTIES OF OFFICERS SERVING IN THE MEDICAL DEPARTMENT, U. S. ARMY, FROM SEPTEMBER 7 TO SEPTEMBER 13, 1886.

WAKEMAN, WM. J., *First Lieutenant and Assistant Surgeon.*—Granted leave of absence for one month, with permission to apply for three months' extension, to take effect when his services can be spared in the Department of the Platte.—*S. O. 207, A. G. O.*, September 6, 1886.

WALES, PHIL. G., *First Lieutenant and Assistant Surgeon.*—Granted leave of absence for one month, with permission to apply for an extension to November 5, 1886.—*S. O. 70, Division of the Pacific*, August 31, 1886.

BANISTER, WM. B., *First Lieutenant and Assistant Surgeon* (recently appointed).—To report by letter to the Commanding General of the Department of Arizona, for assignment to duty.—*S. O. 208, A. G. O.*, September 7, 1886.

WALKER, F. V., *First Lieutenant and Assistant Surgeon.*—Assigned to temporary duty at Fort Adams, Rhode Island.—*S. O. 131, Division of the Atlantic*, September 8, 1886.

OFFICIAL LIST OF CHANGES IN THE MEDICAL CORPS OF THE U. S. NAVY, FOR THE WEEK ENDING SEPTEMBER 11, 1886.

WOODRUFF, C. E., *Assistant Surgeon.*—Ordered to Receiving Ship "Vermont," October 4, 1886.

ATLEE, L. W., *Assistant Surgeon.*—Detached from the "Vermont," and ordered to the "Quinnebaug," per steamer of 25th instant.

BOGERT, E. S., *Medical Inspector.*—Detached from the "Trenton," and placed on waiting orders.

FEREBEE, N. MCP., *Surgeon.*—Detached from the "Trenton," and placed on waiting orders.

BIDDLE, C., *Passed Assistant Surgeon.*—Detached from the "Trenton," and placed on waiting orders.

SCOTT, H. B., *Assistant Surgeon.*—Detached from the "Trenton," and placed on waiting orders.

THE MEDICAL NEWS *will be pleased to receive early intelligence of local events of general medical interest, or of matters which it is desirable to bring to the notice of the profession.*

Local papers containing reports or news items should be marked.

Letters, whether written for publication or private information, must be authenticated by the names and addresses of their writers—of course, not necessarily for publication.

All communications relating to the editorial department of the NEWS *should be addressed to No. 1004 Walnut Street, Philadelphia.*